The Business Magazine for Makers & Users of Chemicals
Management, Research, Production, Marketing

CHEMICAL INDUSTRIES

Contents

Volume 46 Number 3

MARCH, 1940

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Published monthly, except twice in October, and entered as 2nd class matter Dec. 22, 1934, at the Post Office at New Haven, Conn., under the Act of March 3, 1879. Subscription, Domestic and Canada, $3 a year; foreign, $4. Single copies, 35 cents. 522 Fifth Avenue, New York, N. Y. Chicago: 309 W. Jackson Boulevard—Ned Bailey. London: 2 Cockspur Street, S. W. 1—Donald Hunter.

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Temperature... Normal!
MICROMA
LEEDS & NORTHRUP COMPANY
Joseph Poston has a key job in the operation of the rotary lime recovery kilns at Mathieson's Saltville, Va. Plant. He has to keep careful watch at the control panel, to see that an even balance of temperature, feed, etc., is maintained in these kilns.
Vigilant care in every department of production, as well as in handling and shipping, is in large measure responsible for the long-established reputation of Mathieson products for high purity and dependable uniformity.

The Reader Writes—

Old Stuff—Wood Coking For Steel

In your February issue, page 211, there is news from Washington, stating that "Washington sees development of Pacific Northwest Metallurgical industry." To one who has been familiar with the charcoal iron industry in the last century, this comes as a voice from the grave, or as a wild dream. The Ruzicka wood, coking process referred to as new, is identical with British patent, Number 1671 of 1858, where the applicant claims mixing charcoal with tar and re-burning it. Whether this was ever tried on a commercial scale is doubtful, but it is certain it was not used for any long time. Charcoal pig iron manufacture on the Pacific coast is not new and in the early nineties there were charcoal furnaces at Seattle, and perhaps Tacoma. There was one at Portland, idle in 1905 and later torn down. There is not, either in Washington state or in Oregon, any developed iron ore deposits, which would warrant the construction of an iron blast furnace in that vicinity. Many small deposits of iron ores were marked on the map of Oregon, which maps were distributed at the Western Chemical Congress at San Francisco and reported in your September issue. This was in a desperate attempt to find uses for the Bonneville dam water power or electric current.

In the August issue of the CHEMICAL INDUSTRIES the article on "Wealth from Waste" describes what the author considers the beginning of chemistry, charcoal manufacturing, and acetic acid and creosote products when the first savage built a fire and later learned that the meat would keep smoked when hung up over the fire in the cave. The charcoal iron of Sweden is mentioned as is the decline of this industry and manufacture of acetic acid, acetone, and wood alcohol from the charcoal manufacture which have been superseded by synthetic products from calcium carbide, fermentation by the Fernbach process and from petroleum gases.

It is well to look up past history before engaging in an industry which is not understood by those who advocate its resurrection.

There were several charcoal iron furnaces in California built from time to time in the eighties but none survived into this century.

During the great war, the Herault electric furnace was installed by the inventor at the Junction of the Pitt and McCloud rivers, where there is a magnificent deposit of iron ore on one hill and a beautiful limestone outcrop on the adjoining hill. As a "war baby" it was a success and the products are on exhibition in the mining display in the San Francisco Ferry Building where the geological survey is located. The plant was abandoned soon after the war, though there are magnificent hard wood forests further up the Pitt River. This may all be covered with water when the Shasta dam is completed but there will then be a great surplus of electric power generated at Government expense.

On page 147 is an editorial on "Farm Chemurgy" stating "research costs money, and competent authorities agree that $240,000,000 might profitably be spent annually on agricultural research." This is worthy of the New Deal and offers a chance to spend much more than has been wasted by the T.V.A. which the president now explains was really for the purpose of developing a playground

The President a few months ago asked for an iron and steel industry on the Pacific coast not realizing that while there are worlds of fluid fuel as gas and oil, there is no solid fuel there. Pig iron needs solid fuel.

The oil industry is making more and more and better coke and perhaps if this coke were mixed with petroleum tar or asphalt and reburned as briquettes this might solve the problem of making pig iron there. There is now steel capacity there capable of supplying the entire west coast demand for steel. Only a few charcoal blast furnaces are left in running order. Several people still live who know what the conditions were in the past and what is necessary to make the industry profitable in the present and future.

H. O. CHUTE,

Chemical Consultant,
New York.

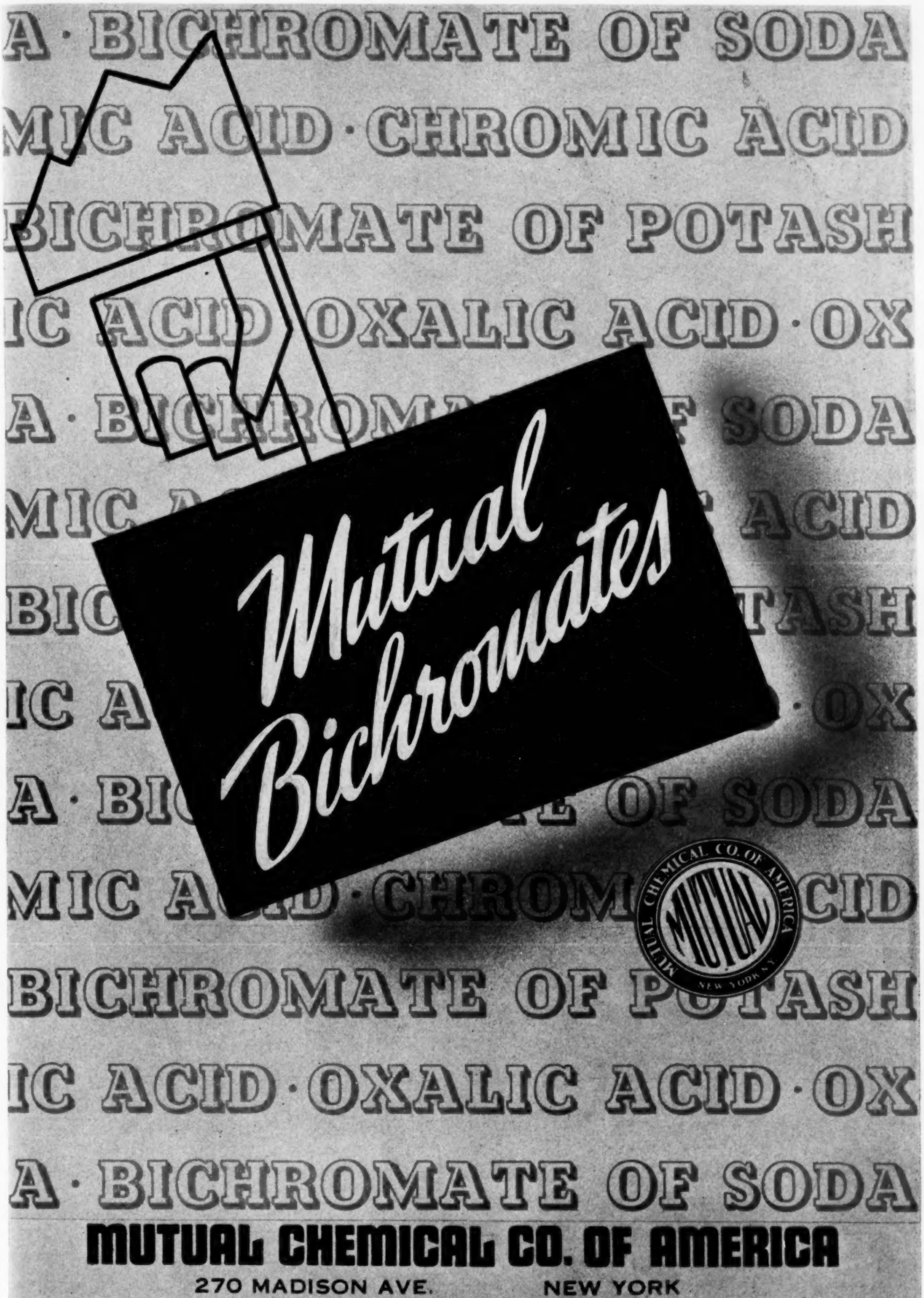
CALENDAR OF EVENTS

March

March 13-16, American Society of Biological Chemists, New Orleans, La.
Mar. 14, 15th Annual DCAT Banquet, Hotel Waldorf-Astoria, N. Y. City.
March 14-15, American Petroleum Institute, Mid-Continent District Division of Production, Wichita, Kans.
March 18-20, American Water Works Ass'n., Southeastern Section, Thomas Jefferson Hotel, Birmingham, Ala.
March 19, American Petroleum Institute, Pacific Coast District, Los Angeles, Cal.
March 20, St. Louis Paint, Varnish & Lacquer Ass'n., St. Louis, Mo.
March 20, 21, 22, New Jersey Sewage Works Ass'n., Silver Anniversary Meeting, Stacy Trent Hotel, Trenton, N.J.
March 21, Chicago Paint & Varnish Production Club, joint meeting with Chicago Paint, Varnish & Lacquer Assoc., Electric Club, Civic Opera Bldg., Chicago.
March 21, Milwaukee Paint, Varnish & Lacquer Ass'n., Milwaukee Athletic Club.
March 21, Oil Trades Ass'n. of New York, Annual Meeting, Waldorf-Astoria Hotel, N. Y. City.
March 25, A. C. S. (Western Conn.)
March 25, Packaging Machinery Division of the Packaging Institute, Inc., Hotel Astor, N. Y. City.
March 26, American Inst. of Chemists, Washington Chapter, Wardman Park Hotel, Washington, D.C., (place tentative).
March 26, Packaging Institute, Inc., Semi-annual meeting, Hotel Astor, N. Y. City.
March 26, Penn. Chap., American Institute of Chemists, Meeting—Dyestuffs & Disease, Christian Assoc. Bldg., 36th & Locust Sts., Phila., Pa.
March 26-29, American Management Association (Tenth Packaging Exposition Conference) Hotel Astor, New York City.
March 27, Colorado Paint, Varnish & Lacquer Ass'n., Denver Athletic Club, Denver, Colo.
March 27-29, American Water Works Association, Canadian Section, Toronto, Ont.
March 28, Chicago Drug and Chemical Association, Noonday Luncheon, Morrison Hotel, Chicago, Ill.
March 28-29, American Gas Association, Industrial Gas Sales Conference, Commodore Perry Hotel, Toledo, Ohio.
March 28-29, American Petroleum Institute, Southwestern District, Division of Production, Houston, Tex.
March 30, American Electro Platers Society, Newark & New York Branches, Joint educational session and social affairs, Hotel Douglas, Newark, N.J.
March 31, New England Paint & Varnish Production Club, Hotel Vendome, Commonwealth Ave., Boston, Mass.
March 31-April 2, Western Petroleum Refiners Association, Annual Meeting, Wichita, Kans.

April

April 1, Chicago Paint & Varnish Production Club, Electric Club, Civic Opera Building, Chicago.
April 1, Minneapolis-St. Paul Paint, Varnish & Lacquer Assoc., Regular Monthly Dinner Meeting, Town and Country Club, St. Paul, Minn.
April 1-2, Tanners Council of America, Official Opening of American Leathers, Waldorf-Astoria, New York, N.Y.
April 1-6, Coastal Empire Paper Festival, Savannah, Ga.
April 3, American Institute of Consulting Engineers, Monthly Luncheon Meeting, City Midday Club.
April 4, Indianapolis Paint, Varnish & Lacquer Ass'n., Columbia Club, Indianapolis, Ind.
April 4-5, American Water Works Ass'n., Indiana Section, Purdue University, West Lafayette, Ind.
April 5, American Chemical Society, New York Section.
April 5, Baltimore Paint & Varnish Production Club, regular meeting, Stafford Hotel, Baltimore, Md.
April 5, National Ass'n. Ptg. Ink Makers, Drs. Meeting, Chicago, Ill.
April 5-6, American Water Works Ass'n., Montana Section, Helena, Montana.
April 7-13, The American Ceramic Society, Annual Meeting, Royal York Hotel, Toronto, Canada.
April 8-10, American Water Works Ass'n., Kentucky-Tennessee Sec., Lexington, Ky.
April 8-12, American Chemical Society, Semi-Annual National Meeting, Netherland Plaza Hotel, Cincinnati, Ohio.
April 9-11, National Safety Council, Western Pennsylvania Safety Council, Annual Safety Engineering Conference, Pittsburgh, Pa.
April 10, New Orleans Paint, Varnish & Lacquer Ass'n., New Orleans Athletic Club, New Orleans, La.
April 10-12, American Association of Petroleum Geologists, Stevens Hotel, Chicago, Ill.
April 10, 11, 12, International Acetylene Ass'n., 40th Convention, Schroeder Hotel, Milwaukee, Wisc.
April 11, New York Paint & Varnish Production Club, 2 Park Avenue, N. Y. City.



A · BICHROMATE OF SODA
MIC ACID · CHROMIC ACID
BICHROMATE OF POTASH
IC ACID OXALIC ACID · OX
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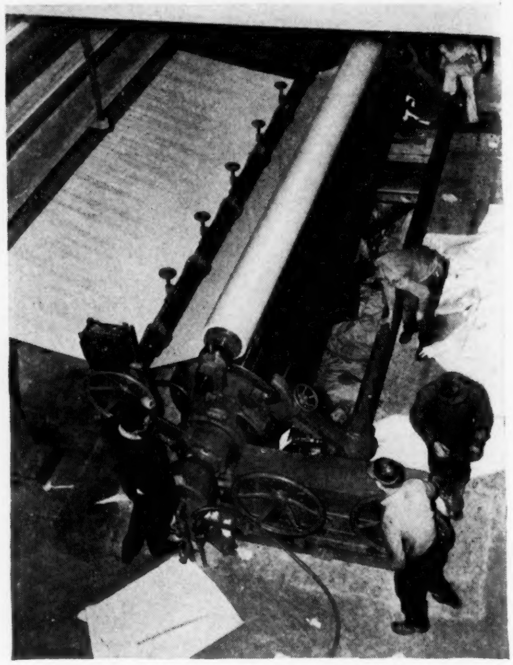
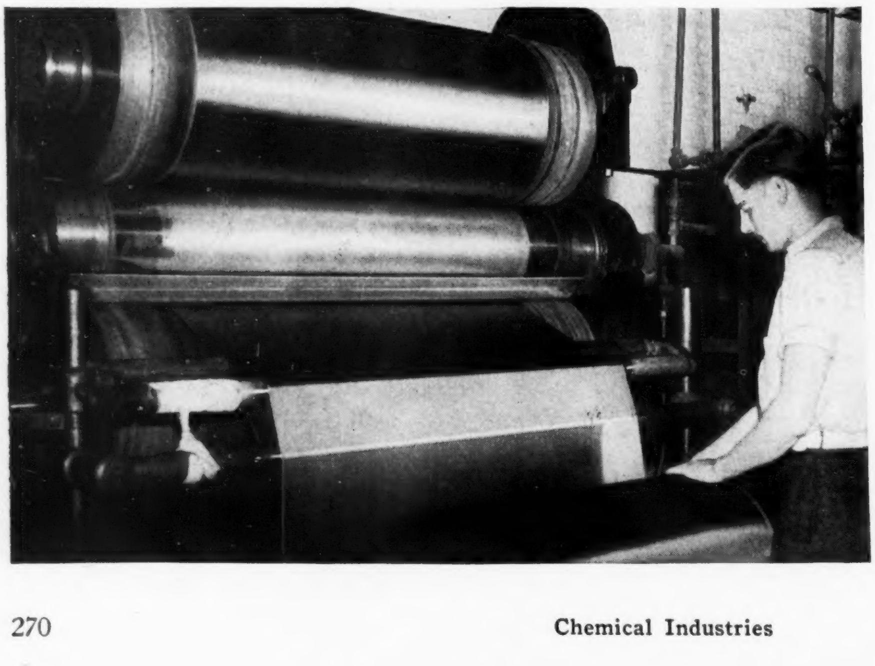
A · BICHROMATE OF SODA
Mutual Bichromates
MUTUAL CHEMICAL CO. OF AMERICA
NEW YORK N.Y.
MUTUAL CHEMICAL CO. OF AMERICA
270 MADISON AVE. NEW YORK
PLANTS AT BALTIMORE AND JERSEY CITY MINES IN NEW CALEDONIA

Life ON THE CHEMICAL NEWSFRONT

(*Above*) **MOVIE MAGIC** outdoes real-life chemists by materializing Loretta Young in this giant retort. A flight of fancy—but not too far-fetched—for workers at Columbia University School of Medicine report the human body is more like a "chemical vat" than the fuel-burning engine to which it is so frequently compared—with food merely entering into the complicated chemical reactions that are constantly going on within the system.

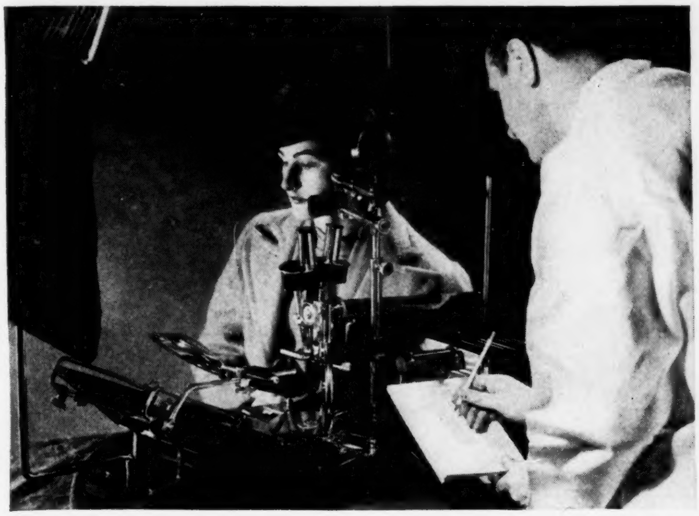


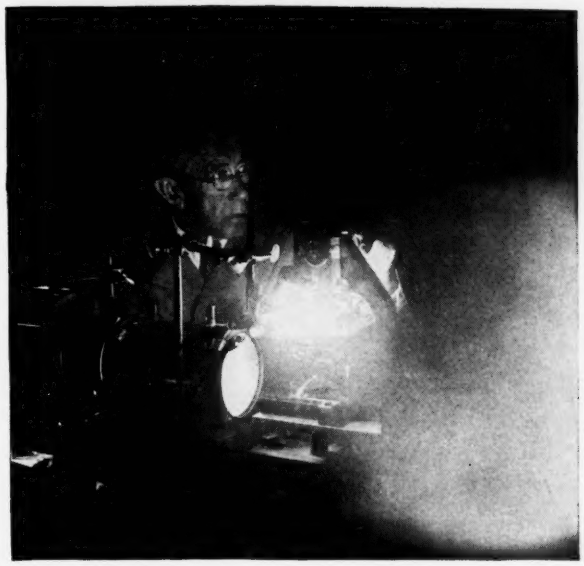
(*Above*) **SOUTHERN PINE NEWSPRINT** became a commercial fact on February 6, when all editions of a Texas newspaper were printed on newsprint derived from this wood. It marked the full realization of the work of the late Charles H. Herty, who first developed the process. Photo shows scene in a new mill at Lufkin, Tex., for making newsprint from Southern pine.



(*Left*) **BETTER TEXTILE FINISHING** is promised by Cyanamid's new AERO Catamine No. 1—a cation-active softener with many advantages over anion types. Since most textile fibres in an aqueous bath become negatively charged, the active cation is substantive, and is attracted to the fabric. Softener will exhaust from the bath; far smaller quantities are needed; softening effect will withstand repeated washings. AERO Catamine No. 1 can be used on cotton, wool, rayon, silk, mixed fabrics. Write for further information.

(*Below*) **SCIENCE IN THE BEAUTY SHOP** matches make-up colors to skin tones with the aid of lenses, prisms, and polarizing screen. Compounding of cosmetics, too, becomes constantly more exacting—requires more careful control of ingredient quality. Typical aid to cosmetic manufacturers is Cyanamid's ISO-BEESWAX, a chemically controlled emulsifying agent especially designed for modern soft cleansing creams. ISO-BEESWAX is lower in cost than pure beeswax, more resistant to rancidity. Complete information will be supplied on request.





(*Above*) **DEATH RAY FOR BACTERIA** is the invisible ultra-violet that accompanies this bright flash of visible light. Bacteria exposed to the ultra-violet light die in a hundred-thousandth of a second. Ray is produced by discharge of condensers across a spark gap and through a modified "Steri-lamp". Microscope and projector allow effects to be studied.

(*Below*) **VITAMINS LOOK LIKE THIS** when finally induced to sit for their portrait. Crystals are Vitamin B_1, photographed by a process developed after months of experimentation, and involving the use of reflected light and a two-minute exposure. B_1 is the anti-neuritic vitamin, occurring in wheat, yeast, eggs, milk, fruit, and vegetables.

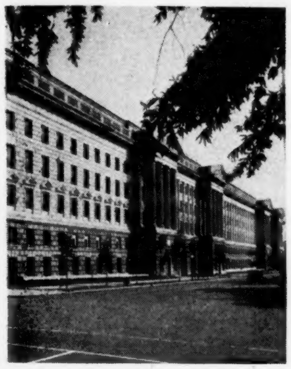
(*Above*) **FLOWERS THRIVE ON CHEMICALS.** These giant marigolds were grown with the aid of colchicine, a compound extracted from the roots of the fall crocus. Doubling the number of chromosomes, colchicine increases the size and vigor of the plant.

(*Above*) **ROBOT FLOOR-PACER** tests wearing qualities of rugs; determines best methods of cleaning them. Cyanamid's Tetra Sodium Pyro Phosphate and AEROSOL* wetting agents are valuable aids in the manufacture of better soaps and cleaning compounds.

The first cylinder of Liquid Chlorine made by EBG in 1909.

CHEMICAL INDUSTRIES
The Chemical Business Magazine
Established 1914

Pioneers of the New Frontiers



Department of Commerce Building, Washington, D. C., now houses the U. S. Patent Office. Scientists and industry are now celebrating the 150th anniversary of the American patent system. (*Erving Galloway Photo.*)

PARTICULARLY fallacious and dangerous is the philosophy of certain politicians and pseudo-economists that with the passing of the Western frontiers fewer opportunities exist for private initiative, private enterprise and sustained growth of the country.

Fallacious because as Dr. Karl T. Compton, president of M. I. T., ably points out "the age of pioneering into new fields of opportunity is now with us, and, so far as we can see, will stay with us with undiminished opportunity for many years to come."

Dangerous because such a contention breeds a spirit of "defeatism," leads the President and his economic advisors to draw the erroneous conclusion that "efficiency of our industrial processes has created a surplus of labor," brings down upon the country an avalanche of ill-conceived laws, poorly administered and with their attendant bureaus and bureaucrats, forces farmers to plow crops under (at a price), shackles industry with a crazy-quilt of conflicting alphabetisms, and delays recovery.

While the billions of dollars that this amateur tinkering with economics has cost is staggering, it is what it has done to the mind of America that is more truly alarming.

Shall we throttle research? Shall we turn future Fords, Ketterings, Baekelands, Langmuirs and Curmes into pick and shovel laborers fearful of the fruits of their fertile brains? Shall we forego new industries that will provide millions of new jobs, new comforts, safeguards of health, new cures for man's ailments and a higher plane of living generally because such progress upsets temporarily the established order and dislocates for a time employment in certain, but relatively few, fields?

Too long industry has failed to dramatize the truth, the real relationship between itself and the scientist. No yardstick of measurement yet has been devised capable of evaluating quantitatively or even qualitatively the combined contributions of the countless technologists, past and present, and symbolized by the five hundred "Modern Pioneers" honored recently by the National Association of Manufacturers. No longer are our "frontiers" defined geographically. Their boundaries are but the limitations of future generations of "Scientific Pioneers."

Editorial

Foreign Trade Outbreak of hostilities abroad last September naturally created an unusually heavy demand for American chemicals. Exports of chemicals and related products during the last four months of 1939 reached the high total of $87,000,000, an increase of 85 per cent. over the $47,000,000 chemical exports in the last four months of 1938. December total was at the highest point since October, 1939, and every major item on the December chemical export list, with the exception of fertilizers, recorded substantial increases, some running as high as 200 per cent. above shipments made in the corresponding month of the previous year.

Despite the war and all of the uncertainties surrounding imports, the total for December reached the highest figure recorded during 1939. In great part this increase was the result of heavy imports of drying oils, gums and waxes. The increase in tung oil was due mainly to the release of stocks in Hankow which had been impounded since the outbreak of hostilities in China.

What is the immediate export outlook and the long-term possibilities? Currently exporters are complaining that the volume has declined perceptibly from the feverish excitement of last year, except for a few items, notably bichromates and chlorates in the heavy chemical field.

One explanation for this may be contained in the British December chemical export figures which show a substantial recovery from the low point in September. British Board of Trade returns for December report a total of £2.49 millions, or nearly two-and-one-half times as much as in September last—and compare with a monthly average of £1.98 millions during the January-August period. Prices, of course, have risen in England, but on the average these increases have not exceeded 20 per cent.

Considerable evidence supports the opinion that Germany is still able to export major quantities through Italy, and all of the belligerents are striving to hold their chemical export business in order to establish foreign credits, as well as to preserve this lucrative trade in the post-war period. England unquestionably is offering stiffer competition to those who are competing for the business formerly enjoyed by Germany.

Heavy and sustained hostilities abroad will probably change this picture and again will create greater demand in this country. How well we will fare in the long run depends upon how much we really want these markets, how far we are willing to compete in prices, and just how well we learn the intricacies of foreign marketing, packaging for export, and how far we will go on terms and credit. One other factor should not be overlooked and exists even now and that is the matter of freight rates. Currently exporters to South America are very much at a disadvantage on this score with European competitors.

Is This Justice? One year ago the Department of Justice, utilizing the services of some 165 "G-men", instituted a sweeping investigation of the fertilizer industry looking for evidence of anti-trust violations. For weeks and even months fertilizer producers were forced to harbor investigators and to open up books and other records for the closest kind of scrutiny.

Now a federal grand jury is convened in Winston-Salem, North Carolina, inquiring into alleged monopolistic practices. Subpoenas have been issued calling upon a large number of companies to produce in that city voluminous original company records.

In the case of Swift and Company this would mean producing all the records of a concern doing nearly $800,000,000 worth of business annually but only a small part, some $12,000,000, in the fertilizer field.

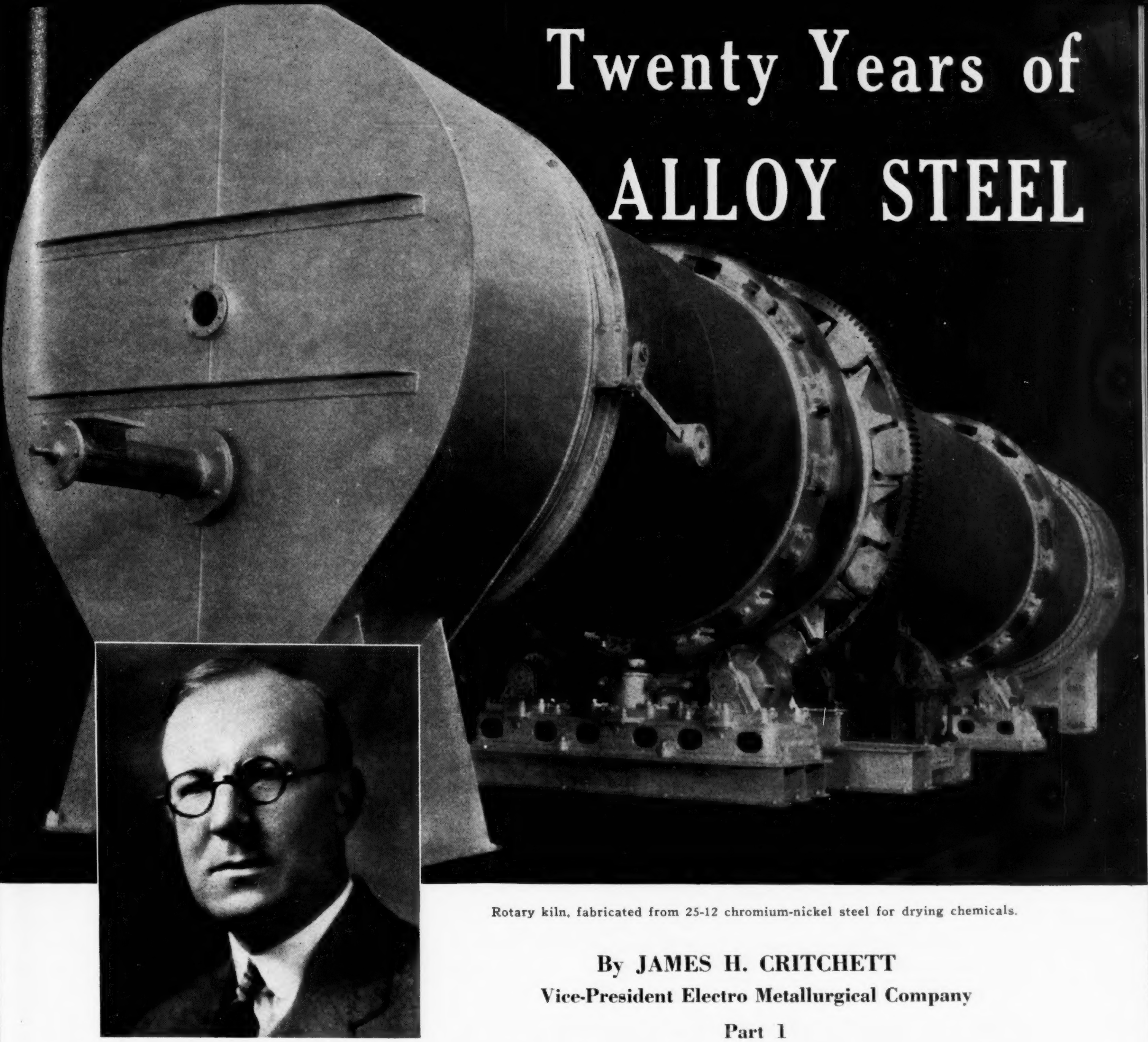
Last April Chemical Industries, commenting editorially on the objects and methods of the Department of Justice in this case, posed the question: "Is this investigation or persecution?" The question appears to be just as pertinent now as then, probably more so in the light of what is now transpiring. At this writing it seems likely that the government will compromise to the extent of accepting certificates in the place of corporation records to prevent transfer of actual books and photostats in place of actual current records to prevent their removal from the places of business where they are needed at this time.

It may or may not be significant that the initial move on the part of the government a year ago and now the present subpoenas have come at the beginning of a fertilizer season. Surely after a year of investigation the agents of the Department of Justice must have discovered that the fertilizer business is a highly seasonal one. Unless the government backs down from its unreasonable stand the fertilizer companies will be unable to transact business at all. Is this a new type of justice? The matter is of vital interest to more than the fertilizer industry. A dangerous precedent will be established, unless the Department of Justice is curbed in its unreasonable demands.

Inter-relationship of Research No better example can be found of the truth that scientific developments of one industry often serve as a basis for important advances in related fields than that provided by the story of the alloy steels, written by James H. Critchett, vice-president of Electro Metallurgical Company. The chemical and chemical process industries have especially benefited from the outstanding research that has occurred in the steel industry particularly in the past 20 years.

Corrosion-resistant alloys used for the fabrication of a wide variety of equipment have materially increased the purity of products; such alloys have made possible the manufacture of products that likely could not have been produced without them. The more highly alloyed steels, able to withstand severe physical conditions, have made possible work with higher pressures and temperatures. Longer life for equipment, lower maintenance costs, and, in some instances, less expensive equipment has been made possible through their wide-spread adoption by the chemical and allied fields.

Twenty Years of ALLOY STEEL



Rotary kiln, fabricated from 25-12 chromium-nickel steel for drying chemicals.

By JAMES H. CRITCHETT
Vice-President Electro Metallurgical Company

Part 1

SO much progress has been made in the steel industry in the last twenty years that a thorough description of it would amount almost to a complete story of modern steel. Important improvements have been made in steel manufacturing processes, new and better compositions have been developed that are more ideally suited to the manifold uses to which steel is put, and numerous cheaper, quicker and better methods of fabrication have been found. So great has been the improvement in the quality of steel that it may safely be said that many modern methods of fabrication are possible only because of the increased ability of present-day steel to withstand bending, twisting, stretching and other severe punishment.

Interesting as is the story of the improvement of plain carbon steel, limitation of space requires that it be but briefly touched in this article and chief emphasis placed on the striking development of alloy steels, which are even more important to the chemical industry. Parenthetically, while not generally so considered, the steel industry itself is a chemical industry. The processes involved in steel-making, although carried on at high temperatures, are chemical reactions just as much as are the more familiar ones that take place at ordinary temperatures. The reactions involve stoichiometric relations, obey the phase rule, have equilibria, are reversible and otherwise follow common chemical laws. The industry is truly a gigantic combination of applied chemistry and mechanics.

Substantially all phases of the steel industry have been affected by the developments of the last two decades. Blast furnaces have enlarged output through better control of the chemistry of their process. The increased size of open-hearth furnaces and the growth of knowledge of the reactions taking place in them have cheapened and improved the quality of the steel which they turn out. Greatly enlarged electric furnaces and better control equipment have widened their application and brought the superior quality of plain carbon and alloy steel which they produce into more general use. But of all advances which have taken place during the period, development of the continuous strip mill is perhaps the most important. These mills take slabs of hot steel and form them into continuous coils of finished plate or sheet in a huge machine having somewhat the appearance of a paper-making machine. This recent method of rolling has been more responsible for advance in quality and reduction in cost of flat steel than any other single development. Sheet turned out from continuous mills is exceedingly uniform and the coils, weighing many tons each, can be sheared

into smaller sized sheets if desired or, fitting into the more modern methods of straight-line manufacture, can be transferred as such to the fabricating shops and uncoiled into the forming machines in a continuous manner. The elimination of many reheating and rehandling steps in the rolling process that has been brought about by the continuous machines has enabled a material reduction in the price of the product which also, because of elimination of waste in shearing and sizing, is more economical in the hands of the user. Truly, this development is one of epochal importance.

Physical Chemistry

The application of physical chemistry to the processes used in the making of steels has brought about important improvements, so much so that steel-making may almost be said to have changed from an art to a science as a result. Application of rugged, dependable temperature-indicating apparatus and of extremely rapid semi-automatic methods of carbon analysis in the open-hearth melting department yielded improved uniform technical results and brought about economy in the use of both refractories and fuel. Studies leading to an understanding of the causes of normality and abnormality in steel brought a knowledge of how to make steels which respond to heat treatment always in the same way and to the same degree with a consequent greater satisfaction to the user and reduction of parts discarded for unsuitable properties after heat treatment. Studies of the very important FeO-C equilibrium in the steel bath, of slag viscosity, and of deoxidation led to a control of non-metallic inclusions, grain size, and the physical properties of steel to a degree that had been impossible hitherto. All of this was reflected first in the higher priced alloy steels and later in the plain carbon steels, so that today both can be made more exactly and used with greater ease and economy.

Superior surface finishes have also been brought out to increase the appearance and serviceability of steel. Improved galvanizing, electroplated tin coatings, bright nickel- and chromium-plated surfaces, and rust-proofing processes all make the product better suited to its ultimate use.

As would be expected, such achievements have been the result of greatly augmented research during the period. Work of this nature, conducted both within individual steel mills and cooperatively in outside laboratories, has been productive indeed. An excellent example of cooperation which afforded great impetus was the research conducted for seven or eight years under the auspices of the Mining and Metallurgical Advisory Boards, the Carnegie Institute of Technology, and the United States Bureau of Mines. Most of the large producing units in the steel and allied industries contributed to the support of this project. A very broadminded point of view is required for the units of an industry as highly competitive as steel to cooperate on problems of mutual interest, as was done in this instance. The results of the cooperation, however, have been of enormous benefit to both producers and users of steel.

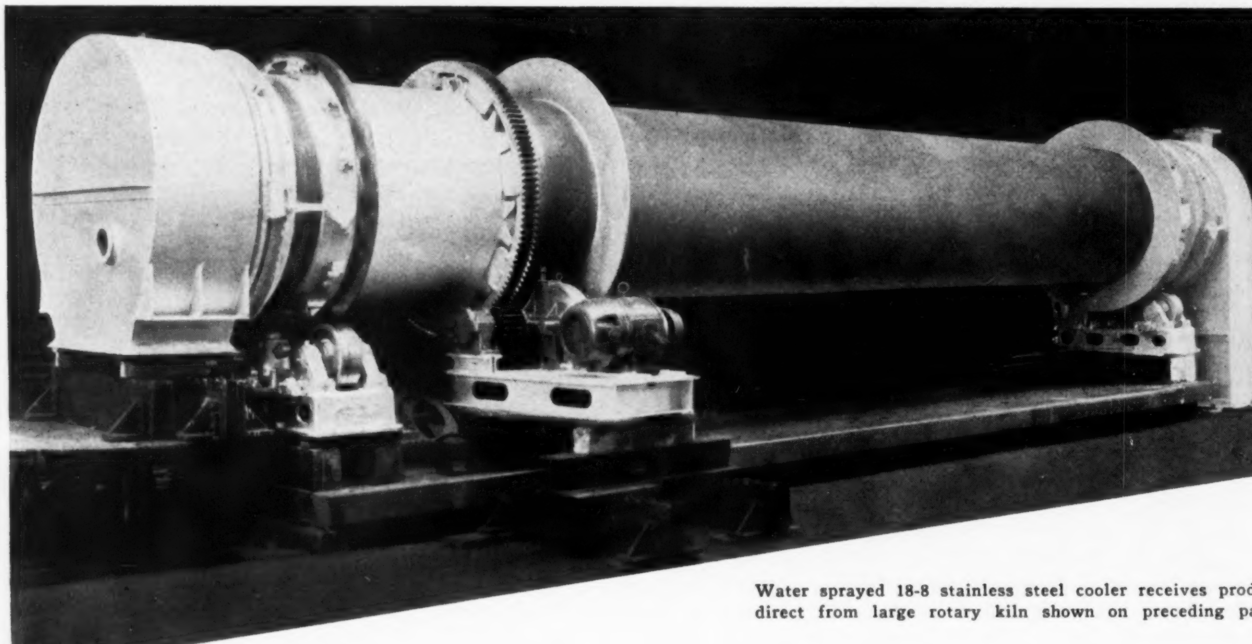
The research of the steel industry itself has been added to considerably by the extensive research of industries that supply its raw materials. For example, the steel producer has benefited much from the superior refractories developed by the ceramic industry. Likewise, increased knowledge of the effects of alloys and complex deoxidizers on the properties and qualities of steel has been freely contributed by the manufacturers of ferro-alloys.

Able and farsighted management has been the prime factor in materializing the many developments of the period. Managers of the steel industry have supported research whole-heartedly, have ruthlessly scrapped old or obsolete equipment, and have invested immense amounts of capital in new and modern machinery in order to effectuate the improvements. Certainly the accomplishments speak highly for the progressiveness of this large and important manufacturing industry.

The chemical industry has been effectively assisted by the reduction in cost of the plain carbon steels used in the building of factories, the construction of boilers, pipe lines, and containers, and in many other applications that require large quantities of ordinary steel. In fact, the simple statement that approximately thirty million steel barrels are turned out in a normal year, a considerable portion of which is used in the chemical and allied industries, and that about seventeen billion cans are annually produced, many of which go into the same fields, indicates in some measure the dependence of the chemical industry on ordinary carbon steel products.

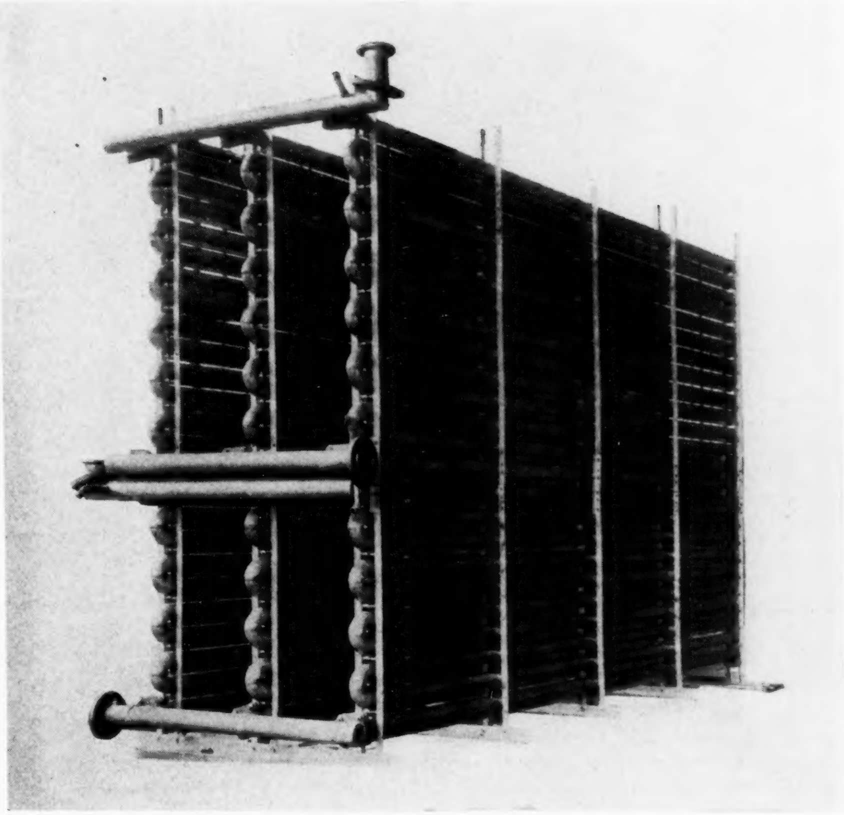
Low Alloy Steel

Many years prior to the period under discussion alloy steels were introduced and used for ordnance purposes, as cutting tools, in the mining industry, and for many other purposes. Their adoption by the automotive industry benefited it substantially and gave marked impetus to the alloy steel industry. Such steels are dependent on drastic heat treatment to



Water sprayed 18-8 stainless steel cooler receives product direct from large rotary kiln shown on preceding page.

develop their properties. This is the variety of alloy steel produced in largest tonnage today. However, during the past decade a new group of alloy steels has been brought out. These steels have high strength, high elastic limit and increased resistance to corrosion, arrived at by careful selection of moderate amounts of ingredients of such a nature that severe heat treatment is not required to put them in condition for use. These more recent steels have been designated by the term "low alloy steels." Their introduction into industry has been rapid and they are undoubtedly destined to play an increasingly important role in the future.



Welded nitric acid cooler fabricated from 16 to 18 per cent. chromium steel.

Properties of Low Alloy Steels

The low alloy steels contain one or more of the elements chromium, nickel, vanadium, molybdenum, copper, manganese, or silicon. Several of them contain in addition a proportion of phosphorus appreciably higher than generally allowed in ordinary carbon steel but which has been found to increase corrosion resistance when combined with other suitable elements. The particular advantage to industry in the use of these low alloy steels is the reduction in weight of material necessary to accomplish a given purpose in structural engineering. In addition to the increased mechanical properties of these steels, it can be readily understood that improved resistance to corrosion is a feature which can be taken into account advantageously when considering the strength-weight ratio of steels expected to endure for many years. Incidentally, it is an indication of the leading position that welding has achieved in the fabricating industry that all of the low alloy steels are readily weldable, that being one of the first requisites in their make-up.

Application of Low-alloy Steels

Examples of the application of these steels comprise railway car construction, including tank cars, high-strength drums, auto tank trucks, and many permanent structures such as bridges, gas producer shells and gas scrubbing towers, to mention but a few. A large gain for the nation's economy is represented in the reduction in weight of railway cars used in handling the large tonnage products such as coal, iron ore, and other bulk shipments. The greater strength of these low alloy steels over plain carbon steels at moderately elevated temperatures, together with the increased corrosion resistance, is appreciated by chemical engineers, so that steels of this class have been successfully used in heavy-walled reaction chambers, riveted or welded pressure vessels, autoclaves, and seamless tubing.

Need High Temperatures

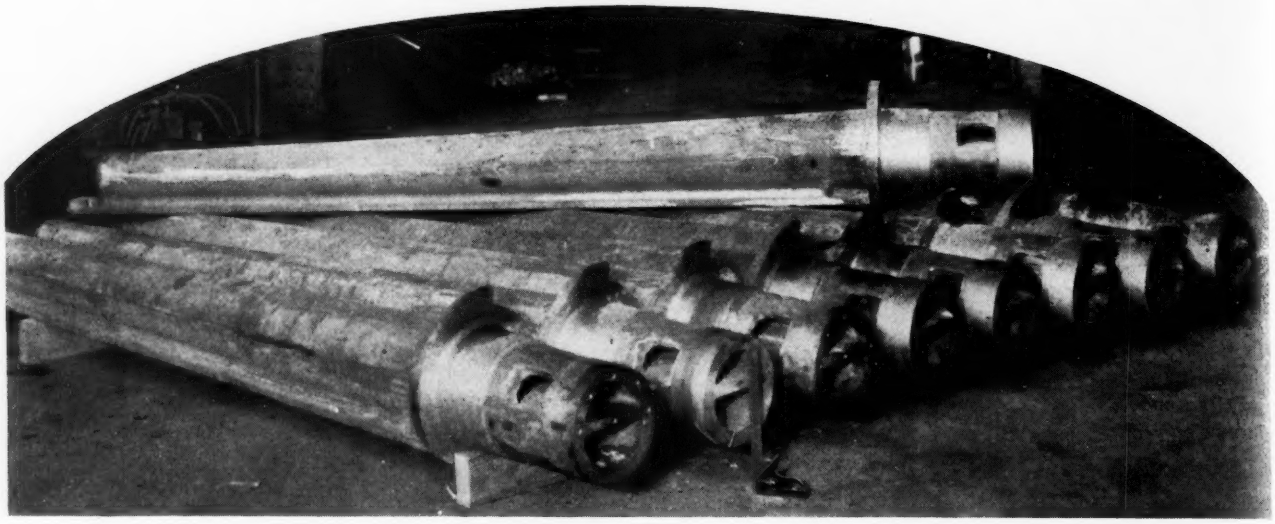
The synthesis of many chemical products such as ammonia from nitrogen and hydrogen, or methanol from carbon monoxide and hydrogen, requires high temperatures and pressures. The reaction chambers early gave much trouble owing to the decarburizing effect of hydrogen, which resulted in fissuring of the steel. The difficulty was solved through the use of low carbon steel containing approximately 2½% chromium and 0.2% vanadium. In more recent years the specifications of steels for this purpose have broadened, because producers have varied the temperatures and pressures. Steels containing from about 1.50% to 2.75% chromium and 0.20% vanadium are in use today. Molybdenum to the extent of approximately 0.50% has been added to the foregoing specification in some instances.

Improvement Over Plain Carbon Steel

Although possibly overstepping the limit generally accepted under the classification "low alloy steels," it seems well to mention here a steel developed about a decade ago which contains from 4 to 6% chromium with carbon 0.20% maximum. Though having a shorter life at high temperatures than the more expensive high alloy chromium-nickel steels which will be described later, it is nevertheless such a decided improvement over plain carbon steel in many applications that it has become the largest tonnage alloy steel employed in the oil-cracking industry. Because molybdenum to the extent of about 0.50% appreciably increases the strength at high temperature, this metal appears in most specifications. While 4 to 6% chromium steel is normally air-hardening, where this property is undesirable and greater ductility and toughness are required, modification of the analysis by small additions of columbium or titanium is effective. When so modified the steel is readily weldable.

High Alloy Steels

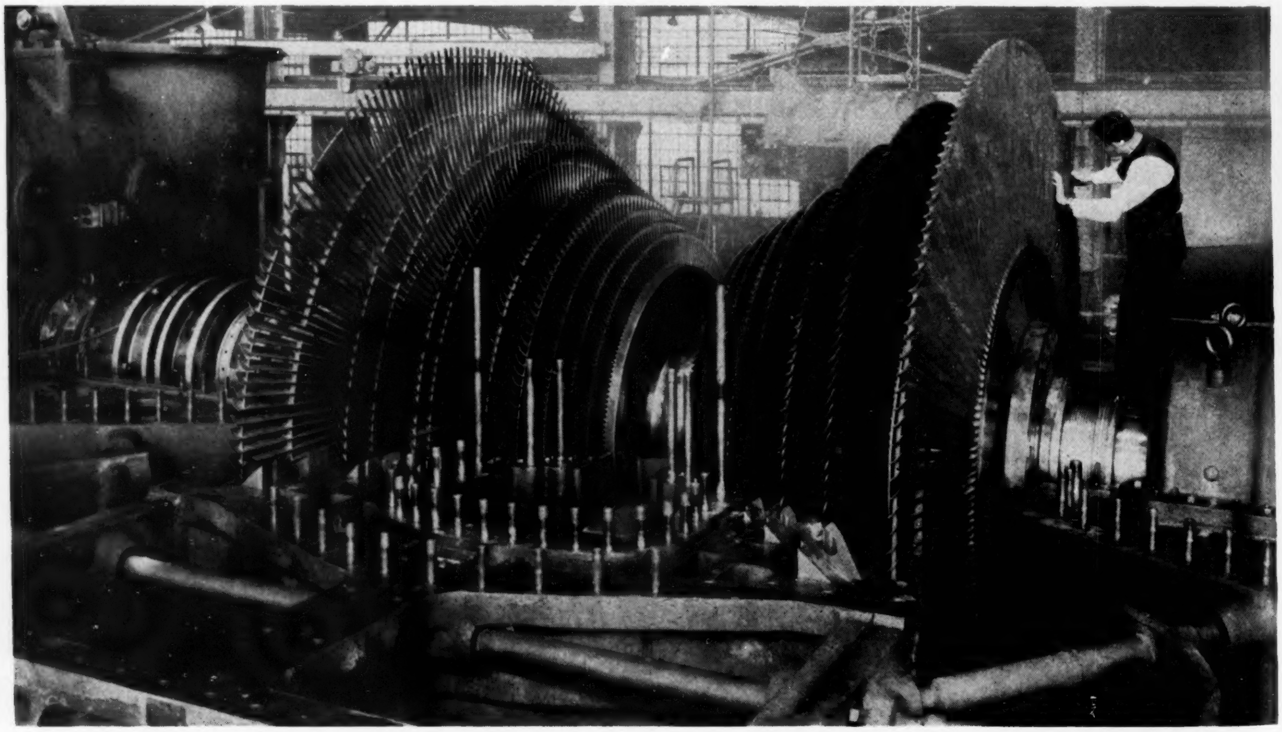
The term "high alloy steel" in general denotes an alloy content of more than 10%. It covers the corrosion- and heat-resistant steels of which there is a large number of qualities and grades. Their common denominator is a chromium content of at least 12%. This element may be present in the amount of 30%, or even more, and its effect on corrosion resistance modified or improved by the addition of nickel, molybdenum, manganese, columbium, titanium, or several other elements. Chromium in correct proportions



These are twenty-four per cent. chromium steel rabble arms weighing 840 pounds each, used in roasting sulfide ores.

induces passivity in steels under oxidizing conditions. Many worthwhile alloys have been developed on this foundation. Nickel, on the other hand, is peculiarly resistant to attack under reducing conditions. Therefore, it is only natural to suppose that combinations of the two alloying elements in proper proportions would produce steel with greater resistance to many kinds of corrosion than could be secured from either one alone. Steels of the chromium-nickel type are therefore resistant to a much greater variety of chemical attack than the plain chromium steels. No one class of steel resists all types of corrosion or possesses mechanical properties that would fit it for every application. Today engineers in all fields, and especially chemical engineers, must concern themselves with the modern corrosion-resistant steels now available in a great variety of compositions and mechanical properties.

The earliest commercial stainless steels contained 12 to 14% chromium and were first used for cutlery. The better cutlery grades now contain about 16 to 17% chromium and about double the carbon of the original steels. Articles made of these steels are so common today that they can be purchased in all types of stores, from the low-priced chain stores to exclusive shops, and it is sometimes hard to realize that they are of such recent advent. Steels of this class find use also as valve parts, scrapers and dies requiring a combination of hardness with corrosion and wear resistance. Through slight changes in composition and modification by proper heat treatment a wide range of mechanical properties is obtainable. So the engineer has available today steels that combine with corrosion resistance exceptionally high strength. It is not surprising that steels of this class promptly found many important industrial applications, the most spectacular being their use as turbine blading, where resistance to erosion and corrosion is essential in combination with a high elastic limit.



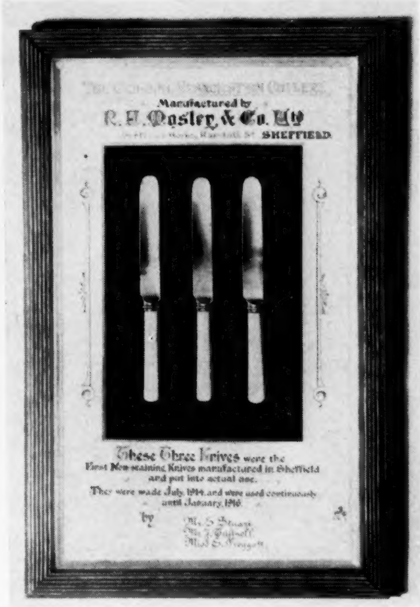
View of the low pressure element of a 165,000 kilowatt capacity steam turbine during erection, showing some of the 15,000 stainless steel blades. This turbine uses steam at 375 pounds per square inch pressure and operates at a temperature of 440° C.

Increased chromium content improves resistance to corrosion, although not without exception, and low carbon content is usually beneficial to workability and enhanced corrosion resistance. So corrosion-resistant steels containing chromium from 16 to 18% and carbon under 0.15% were a natural development. While these steels cannot be varied by heat treatment as can the 12 to 16% chromium steels, nevertheless they have enjoyed a broad industrial use.

Nitric Acid

Ability of the steel industry to produce 16 to 18% low carbon plain chromium steel when in 1925 demand arose for a material which would permit satisfactory large-scale production of nitric acid by the oxidation of ammonia, had much to do with the success of the process. By eliminating corrosion and enabling the process to operate under moderate pressure, the plants were given permanence and reduced from an unwieldy to a practical size. The tonnage required was relatively huge at that time, and no other available substitute possessed the properties essential to successful operation. This development has constituted one of the major achievements in the use of new materials for chemical plant equipment in the past twenty years.

Steels of still higher chromium content have contributed their share to progress.



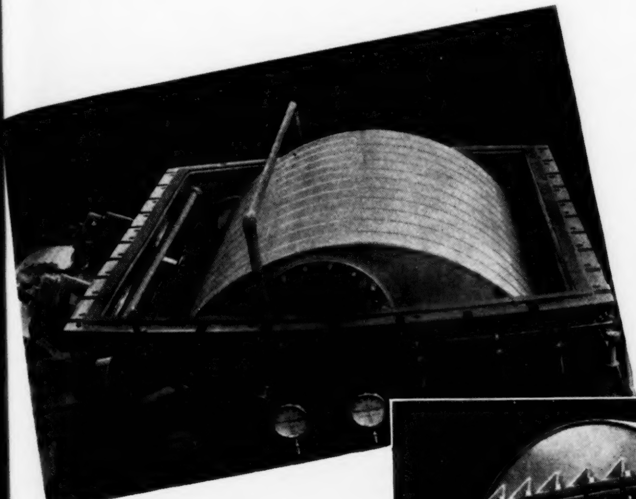
These knives represent the first commercial use of straight chromium stainless steel of the 12 to 14 per cent. type.

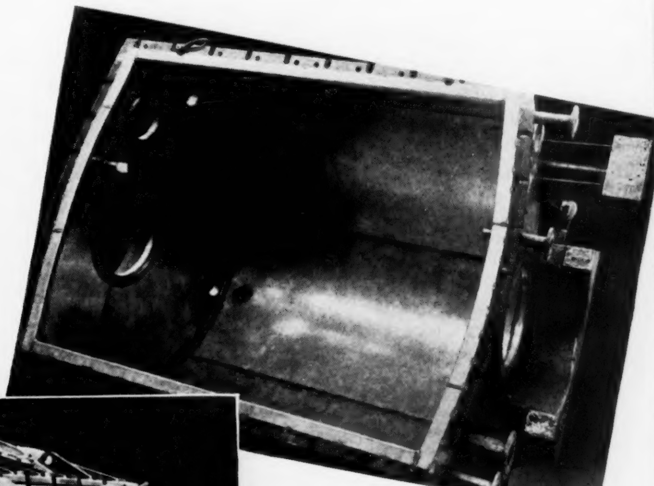
Even prior to commercialization of stainless steels of the low carbon type, steels having chromium contents from 20 to 30% had made appreciable industrial headway, particularly in the form of castings. Great resistance to oxidation at high temperatures and excellent resistance to wear gave the steels containing more than 20% chromium their early start. Also, it was soon found that they are especially valuable where resistance to attack by sulfur-bearing gases at high temperature is necessary. Because of these properties, diversified applications have been found in annealing and many other types of furnaces, recuperators, heat exchangers, and ducts conveying corrosive gases at high temperatures. For many years steels of this class have been used for rabble arms and blades of roasting furnaces with great economy.

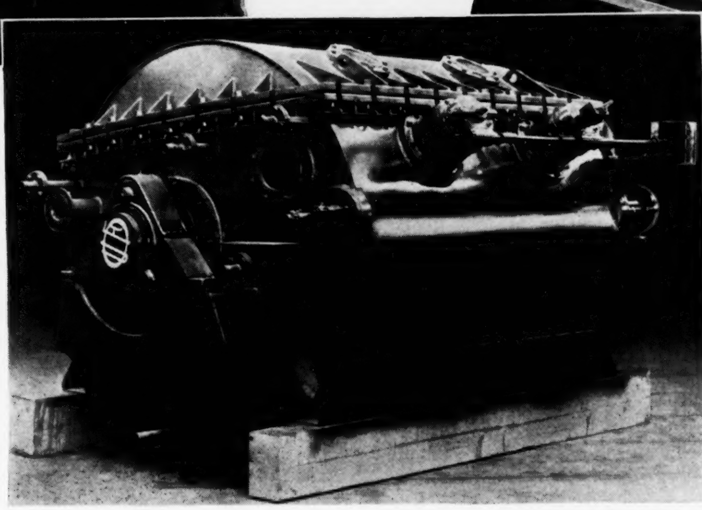
Carbon Content

The carbon content of this group of steels materially influences the physical properties. The low carbon variety, usually containing 25 to 30% chromium and 0.10 to 0.30% carbon, may be readily forged, rolled, or pierced for seamless tubing. Castings usually contain 25 to 30% chromium with carbon varying up to slightly under 3%, according to the wear resistance and toughness required.

The higher carbon 20 to 30% chromium steels (generally between 25 and 30% chromium) have a remarkably high resistance to abrasion, although they have not the toughness of the long-used Hadfield manganese steel (12 to 14% manganese) so successfully employed in countless applications where resistance to combined shock and abrasion is required. These chromium steels have







Every part of this rotary filter shown in three separate views is lined with stainless steel to prevent corrosion and to guard against product contamination.

offered extremely good wear resistance where high impact strength is not involved.

Use in Mine Pumps

One of the early applications of the high carbon, 25 to 30% chromium steels was for pumps and other equipment in the handling of acid mine waters, where resistance to both corrosion and wear (on account of silt) was necessary. Steels of this class continue to be used for this purpose. Since on the average more than a ton of water must be pumped for each ton of coal produced and in some cases several times this amount must be handled, the importance of long-lived equipment to the coal miner is readily apparent.

Other Alloying Metals

Although the aforementioned steels continue to achieve industrial success when properly chosen, some of their properties may be improved through the addition of other alloying metals. Nickel is the great contributor; and the chromium-nickel series of steels may be considered the most important industrially of the entire group. The story of these and the other newer steel products will be continued in the concluding section of this article.

Part II will appear in the April issue.

Testing Latex

Control testing has long been recognized as a valuable aid to manufacturers in many fields. Rubber latex contains a large quantity of non-rubber constituents which control the colloidal properties of the material. The source, the method of concentrating and preserving the latex, and the bacteria and enzymes present all exert an influence on the state of these non-rubber constituents.

Because of so many variable factors that affect the physical and chemical properties, control of materials and products must be rigid in rubber latex processes.

In an article by D. E. Fowler and Williamina Thompson of the Naugatuck Chemical Division, U. S. Rubber Co., analytical methods are presented for the examination and control of rubber latex, latex compounds, and artificial dispersions of crude and reclaimed rubber. *The Rubber Age*, Jan., '40, p. 223.

Germany's Oil Supplies

The extent of Germany's ability to cover her requirements of oil in time of war is obviously a question of vital importance to a great part of the world at the present time. For several years one of Germany's main policies has been to conserve and prepare for the present situation, and it is therefore interesting to estimate what success has attended these efforts to guard against oil shortage.

Because of the rapid expansion in production it is necessary to make two estimates of Germany's oil supplies. One of these relates to present production and a second includes those plants which are likely to be in production some time in 1940. It is convenient for these figures to consider Germany, Austria and Czechoslovakia as a single unit.

A number of items enter into the total of Germany's oil and fuel supply. They are: natural petroleum, benzol, brown coal tar oils, bituminous coal tar oils, ethyl alcohol, methyl alcohol, producer gas, and colloidal fuel and coal dust.

The figures below give the present and potential rates of production:

Sources of Oil Supplies

	Present rate of production. Tons per year	Potential rate of production. Tons per year
Natural petroleum	700,000	1,000,000
Synthetic production	2,000,000	3,000,000
Benzol	500,000	600,000
Brown coal tar oils	200,000	400,000
Bituminous coal tar oils	250,000	400,000
Ethyl alcohol	200,000	200,000
Methyl alcohol, isopropyl alcohol, n-butyl alcohol, isobutyl alcohol, acetone, methyl ethyl ketone	100,000	200,000
Bottled gas	150,000	250,000
Producer gas from wood, charcoal, coke, anthracite	200,000	500,000
Total	4,300,000	6,550,000

The oil consumption of Germany, including Czechoslovakia, in 1938 amounted to 7,900,000 tons. The excess of consumption over production must be met by imports. The sources for imports available to Germany are Estonia, Rumania and Russia. Based on past performance Estonia will probably be able to supply 150,000 tons per year. Rumania is an important producer and based on recent trade negotiations will be able to supply about 1,600,000 tons per year. Russia is the world's second largest producer of oil but does not have a great deal for export. It is considered probable, however, that Russia could supply 1,000,000 tons of oil per year to Germany.

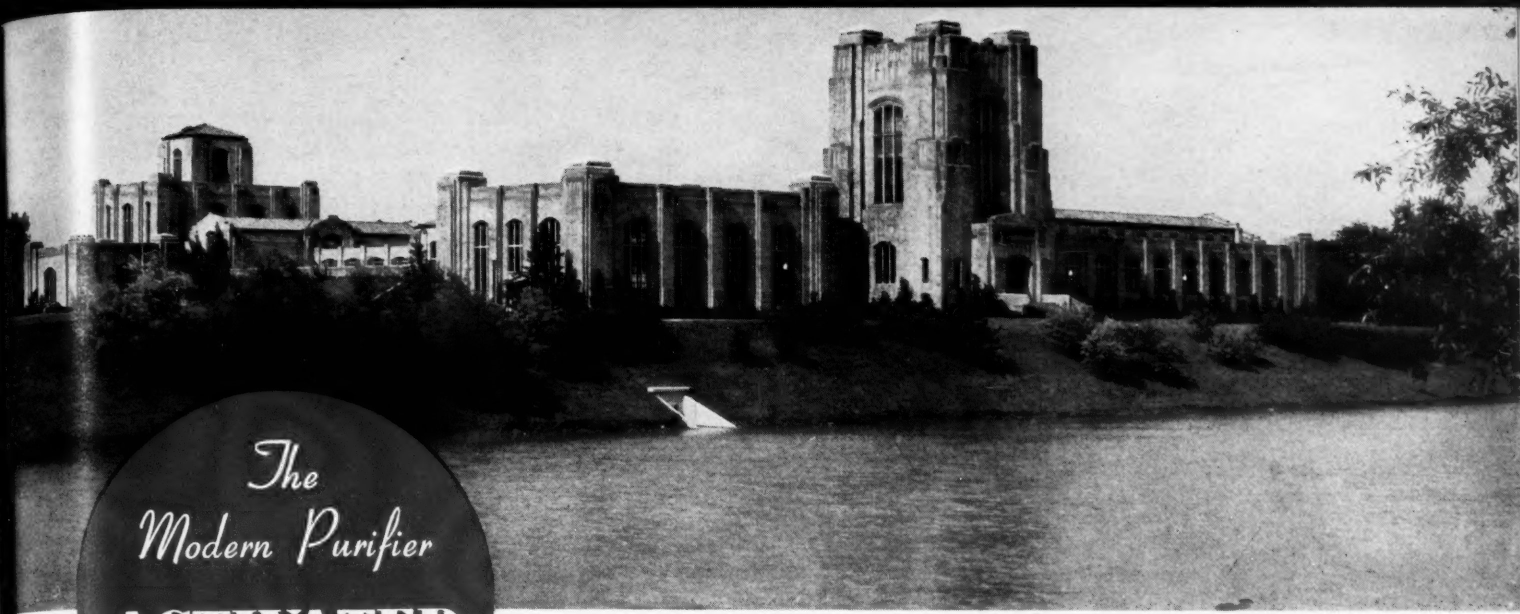
With such imports assured from these three countries, which is likely to be the case unless political conditions change greatly, the German resources of home-produced and imported oil would amount to 7,000,000 tons a year at the present time with potential resources, as home production is increased, of 9,300,000 tons per year. The consumption in war-time is difficult to estimate because it depends on the extent of military operations. There will, however, undoubtedly be an increased consumption to some extent. It is known that Germany possesses large reserve stocks of oils and these should be sufficient to bridge over the period until the potential capacity becomes fully operative. It therefore appears improbable that Germany will be rendered unable to carry on the war owing to shortage of oil unless military activity on extremely large scale results in large increase in consumption or unless present sources of oil imports are cut off or unless Germany's productive facilities are seriously reduced through damage resulting from military operations. *Canadian Chemistry and Process Industries*, Dec., '39, p. 593.

Water Softening

The economical use of soap is a very important matter in Germany at the present time The use of soft water greatly reduces the consumption of soap and thus water softening has received some attention. There are three main systems; the use of zeolites, the use of chemicals which will precipitate the calcium and magnesium salts, and the use of metaphosphates or polyphosphates which mask the hardness. The first and third of these systems are usable in large plants with complicated installations. For small plant or home use, it is necessary to consider changing the calcium and magnesium salts into substances which will not combine with soap. It is with this last method that Erich Heinerth has experimented. Most interesting, he finds, is sodium carbonate, which is extremely effective. Chemically pure carbonate reduced hardness from 20° to 8°, while commercial carbonate reduced it to 3.2°. The reason for this difference, he explains, is that commercial carbonate contains a little calcite, affording a nucleus around which the precipitate of calcium salts can crystallize. An even better result was obtained by the use of a little sodium silicate with the carbonate. In small quantities, Heinerth points out, this has no harmful effect, and is, in fact, a good substitute for soap. A commercial softening preparation comprising 49% Na_2CO_3 and 8.6% Na_2SiO_3 provided a reduction of hardness from 20° to 2°. In practice, the time required to obtain this result is about 15 minutes. It is important, however, that there be no soap or colloid (such as starch) in the water, as this prevents the soda from working. A large excess of soda is not necessary, about double the theoretical quantity required being sufficient.

"Butyl Eight"

An active, low temperature, dithiocarbamate accelerator for the self-curing of rubber goods, "Butyl Eight" makes possible the self-curing of various kinds of rubber goods at room temperature. It is used in rubber cements for making single- and double-texture materials (e.g., shower curtains, clothing) and also finds application in the production of certain self-curing calendered and tubed goods.



The Modern Purifier ACTIVATED CARBON

Water purification plant of the City of Fort Wayne, Ind.

Practically unknown in chemical lists twenty-five years ago, activated carbon has become an indispensable purifying medium in certain fields. The author here describes properties and uses of this material, as well as new applications.

A LITTLE more than twenty-five years ago, you could look in vain for this product in any catalog or list of chemicals manufactured in this country. As a matter of fact, it had no existence anywhere by its present name—which, as will be seen, came later. At that time, the idea of producing such a material here was in the germinating stage. Today, it reaches into the highways and byways of industry to an extraordinary degree and has become indispensable in the operation of many process industries, having the responsibility of maintaining the highest quality standards.

It is one of those chemical products, or chemical discoveries, that rarely sees the light of day in the form of headlines in either daily, trade, or chemical press. Like "Topsy," it has just grown up and, in the United States at least, from humble beginnings. Assuming some curiosity has been aroused, let us proceed to answer the question that inevitably will arise in the minds of many readers: What is it? What does it do?

The Condensed Chemical Dictionary defines activated carbon as follows:

"Activated Charcoal (Active carbon). A more or less pure form of carbon characterized by a high adsorptive capacity for foreign molecules. This adsorptive power is due partly to the chemical nature of the carbon atom with its attendant free valences and partly to the capillary structure of the charcoal, which presents an enormous adsorptive surface. Other factors, such as condensation of gases and vapors in the capillaries, solid solution and chemical combination, also contribute to its adsorptive power. Activated charcoals cover a wide range of adsorptive power for various foreign molecules, depending primarily upon the size of the capillaries and the size and chemical properties of the molecules to be adsorbed."

While it is questionable if the limited number of experts, having any real knowledge of the subject, will all agree with this definition in toto, it is sufficiently explanatory, in a technical sense, for the purpose of this article. However, to the business mind, it may not be so informative or clear, because it is a definition that departs somewhat from the usual form of description of a chemical product, and so, we will define it more in terms of business language.

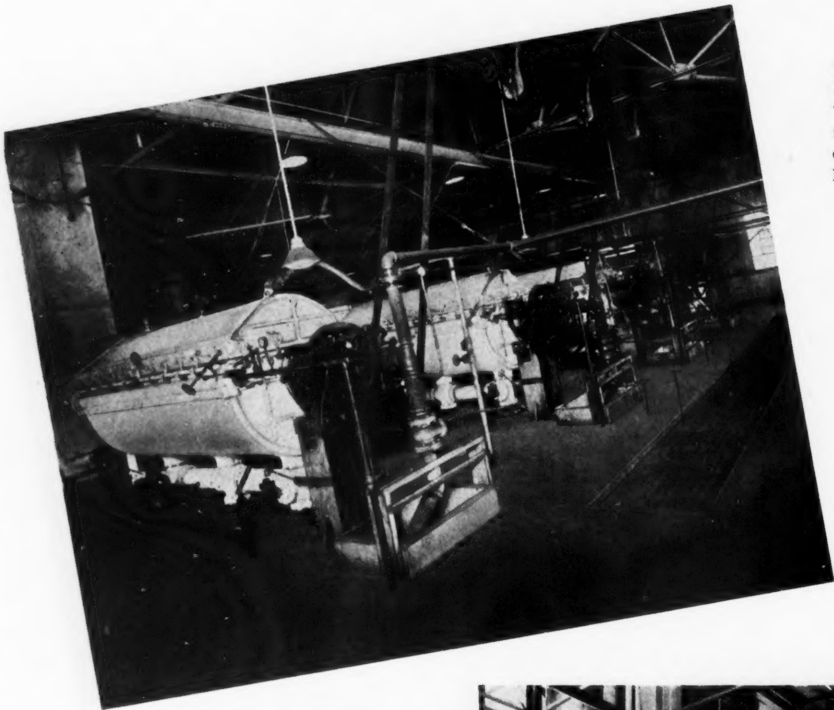
Briefly, activated carbon can be aptly referred to as a bundle of energy which comes immediately into play when thrown into a liquid, grabbing and retaining to itself the impurities present therein. This statement, while true, perhaps is not too helpful as an explanation. Therefore, we will expound further. In some instances, it has been questioned whether activated carbon is a chemical, in the generally accepted meaning of the word. In actual chemical analysis, there is no difference between inert carbons, such as coal or coke, and the activated form of carbon now under discussion. Yet, the latter possesses extraordinary power to attract and retain the impurities (some of which may be in colloidal form) from the liquid or gas with which it comes into physical contact. The inert coal or coke has none of this power. The activating process has brought about certain changes in the physical make-up, including incidental opening up of the pores, and in this respect the difference between the two can well be likened to that of ordinary rice (the inert carbon) and puffed rice (the activated carbon). As indicated in the Dictionary definition, something else happens that gives the activated carbon extraordinary power to attract and retain impurities. A simple illustration is to compare this difference between the inert and active carbons with that of magnetized iron which attracts iron filings and the unmagnetized metal which does not. Such physical power to attract and retain is referred to as the phenomenon of adsorption.

Joseph Wrench
Sales Manager

Industrial Chemical Sales Division
West Virginia Pulp and Paper Company

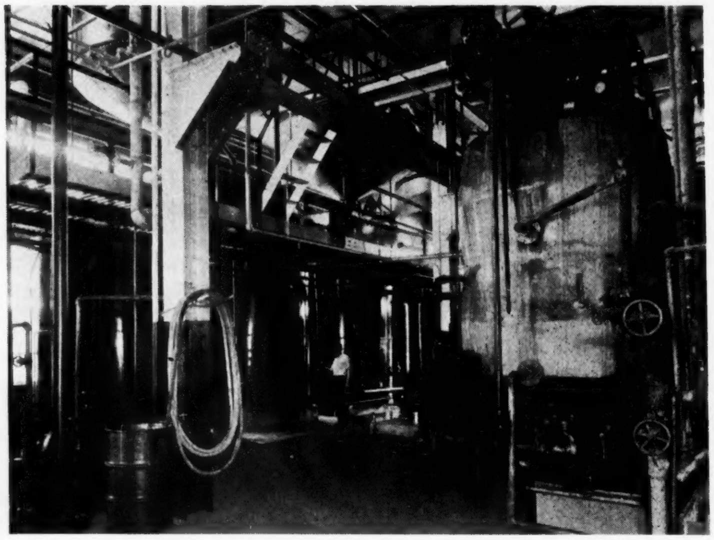
Before proceeding further, a short historical background, antecedent to the subject product, should be both helpful and interesting, as well as offering a logical sequence to this story of the modern purifier.

It is well known that the element carbon occurs in many thousands of different forms, ranging from coal, costing but a few dollars per ton, to the diamond of fabulous worth—and both would be worthless as a purifier. However, in the present instance, we only need to make



Left—Filtration station at the Insular Sugar Refining Company, Bam ban Tarlac, Philippine Islands. Capacity of refinery is 150 tons of refined sugar daily. Photo by courtesy of Suchar Process Corporation.

Below—Refining room of oil refinery at Columbus, Ohio. Photo by courtesy of Capitol City Products Company.



reference to two forms known as wood charcoal and bone charcoal; the former a reasonably pure form of carbon and the latter quite an impure form; each too well known as commercial products to need description.

For centuries, men of science have had great faith in the healing properties, or therapeutic value of wood charcoal, and a great amount of research is recorded in this direction, traced as far back as the time of Hippocrates and Pliny. In early times, wood charcoal was prescribed in cases of epilepsy and vertigo and in the treatment of chlorosis and anthrax. For many centuries, however, wood charcoal fell into disuse, but throughout the 19th Century there are many examples recorded of wood charcoal, as well as bone charcoal, being recommended in certain cases of poisoning. Much more could be said of this phase of the subject, but inasmuch as our present purpose is to deal with carbon as applied to industry, we must pass on.

As far back as 1777, Scheele and Fontana discovered that wood charcoal would attract and hold gases, and a few years later, Lowitz recorded that colored liquids could be decolorized by filtration through the same medium. However, only limited practical use was made of these discoveries, probably due to the large quantities of wood charcoal required. In 1810, Figuier proved that bone charcoal possessed considerably more decolorizing properties than ordinary wood charcoal, and in 1822 Payen described a method of decolorizing beet sugar with bone charcoal, which later came into general use for the decolorizing of sugar juices.

With the turn into the 20th Century, research laboratories in Europe began studying methods of making a charcoal more efficient in decolorizing power, and a few years thereafter began the production of carbons, relatively much advanced in decolorizing efficiency or activity. With the introduction of gas as a weapon in the World War, the earlier knowledge of the ability of charcoal to adsorb gases was utilized. The seriousness and urgency of the situation provided a great stimulus to both research and manufacture, from which was obtained the material that was and continues to be made use of in gas mask cannisters. Incidentally, it was during the research work done by our Chemical Warfare Service in 1917-18 that the term "activated" was first applied to describe the difference between carbons that were inert, and had little or no power to attract, and those carbons that had been given this power to attract and, so, active.

One important result from this work was to establish the fact that an effective and satisfactory gas mask carbon must be hard and dense in structure, with minute pores. In consequence, this form of activated carbon is made from charred cocoanut and other nut shells, also, in some instances, from coal. On the other hand, activated carbon, as used for decolorizing and deodorizing purposes, is best made from softer carbonaceous material with more open pores. The two types of activated carbon are very rarely interchangeable as to use and, consequently, occupy definitely distinctive fields of use and application. The gas adsorbing type of carbon has developed more as a chemical engineering process for the recovery of solvents, of which the carbon is only a part. Therefore, though related in character, the two carbons, by and large, travel along two distinct roads of industrial endeavor. For this reason, the writer has left the story of evolution of the gas adsorbing carbon to be told by those more competent; and what follows from now on will apply only to that type

of activated carbon used for decolorization, deodorization, and general purification of liquids, or products that can easily be brought into liquid form.

As has already been stated, the manufacture of this more active form of charcoal or carbon began in Europe soon after the turn of the present century and was developed in connection with its use in the refining of beet sugar. It will be interesting to interject that the European method of refining beet sugar is a two-stage process of first producing raw sugar and then refined white sugar, as is common in the production of refined cane sugar; whereas the American beet sugar manufacturers carry their refining through one continuous operation, utilizing the Steffens process.

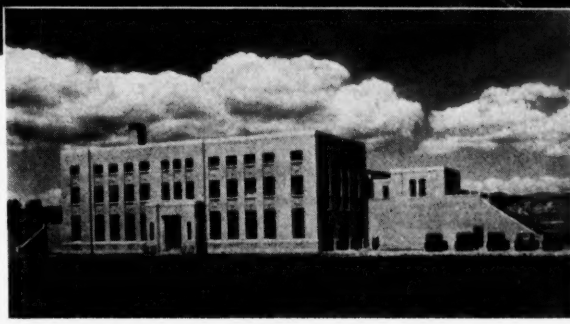
U. S. Manufacture

I believe our organization can properly claim priority in pioneering the development of decolorizing and deodorizing carbons as a regular, practical operation in the United States. It has been the story of a waste by-product "Cinderella." Actually and figuratively, there was thrown in the laps of a small research staff—just beginning to find its feet—the problem of satisfactorily disposing of a considerable volume of carbonaceous material that had become somewhat of a nuisance and demanded urgent attention; and necessity again became the mother of invention. By the late fall of 1913, commercial research led us into the study of the decolorizing properties known to be possessed by bone charcoal and, to some lesser degree, by wood charcoal; and a little later, like properties in some of the earths and clays, particularly Fullers Earth, which latter was then being used quite extensively in the refining of vegetable oils as a decolorizing medium.

Early in the investigation, one outstanding and somewhat discouraging fact came to light, namely, the absolute lack of any kind of information on the subject of decolorizing mediums, printed or otherwise, a condition that more or less still prevails. The materials mentioned all had decolorizing power in varying degrees, but no one seemed to know the reason therefor. Whatever was being done in Europe was by secret and undisclosed processes. Hence, it was a start from scratch in every sense, and necessarily there was a long period of evolution, exemplifying to a marked degree the virtue of the old copybook maxim, "If at first you don't succeed, try, try, try again"—and we did for long years. A real chemical engineer of present-day qualifications would have been worth his weight in gold at that time.

Raw Material

In the manufacture of activated carbon various raw materials are utilized, generally of vegetable origin. Production is usually carried on under patented processes, making use of gases, such as air, steam, carbon dioxide, chlorine, and similar materials, involving treatment at high temperatures. In some instances, various chemicals are employed for the removal of the inactive constituents in the basic material. In the processing—as previously stated—a porosity is obtained that has an important bearing upon the ultimate efficiency of the product.



Above — Interior view, Rapid Sand water filtration plant which has a capacity of 56,000,000 gallons daily. Left—Exterior view of plant, Denver, Colo.

Most of the commercial activated carbons appear in the form of fine, black powders. As they are found on the market, their characteristics vary quite a little; some are neutral, some acid, and some alkaline, depending on their method of manufacture, the raw material from which they are made, and their intended use. Today American manufacturers are producing commercial activated carbons possessing 20 to 50 times the decolorizing and deodorizing (adsorptive) power of the older bone charcoal.

Characteristics

Notwithstanding the Dictionary definition already quoted, it will be simpler to consider the action of the carbon as physical rather than chemical, by reason of the phenomenon that is now termed "adsorption." The exact mechanics of adsorption are not as yet thoroughly understood, but the present tendency is to connect it with such factors as surface action, electrical charges, and chemical activity of some nature. To give some idea of the surface potentials, it has been reliably estimated that a cubic inch of activated carbon will have a combined external and internal surface of 20,000 square yards, in which is indicated the value of porosity.

It is customary to buy most chemicals on the basis of quality standards commonly established and known throughout the industry. For example, in buying chlorine, caustic soda or any of the commercial acids, the quality of each would be interchangeable as from any producer and the results from their use would be identical. To follow such a procedure in the purchase of activated carbon is impractical. This is due to a distinct, outstanding characteristic, common to activated carbons in general, namely, their peculiarly selective nature, whereby different makes and qualities of carbon show a particular affinity for specific bodies contained in specific products. This lays unusual emphasis on the necessity for determining by test the actual value of activated carbon for any particular use and derived from different sources. Again, we will turn to simile for illustration, and so, the purpose of a staple, standard chemical could be likened to that of purchasing a ready-made suit and the purchase of activated carbon to that of buying a suit made-to-measure.

While there is no common yardstick to measure the efficiency of activated carbon, there have been, however, a number of evaluating test methods established that furnish pretty good indicators. These include such tests as: molasses, iodine, permanganate, methylene blue, phenol and threshold odor test (for water). While one or the other of these tests are used to advantage in certain regular consuming industries, in the main, it is more advantageous to use the "best-by-test" method, and preferably this should be done on a plant or semi-plant scale because laboratory tests do not often tell the complete story. To take data from the tests of one make and/or quality of carbon and apply it to another carbon is likely to be quite misleading.

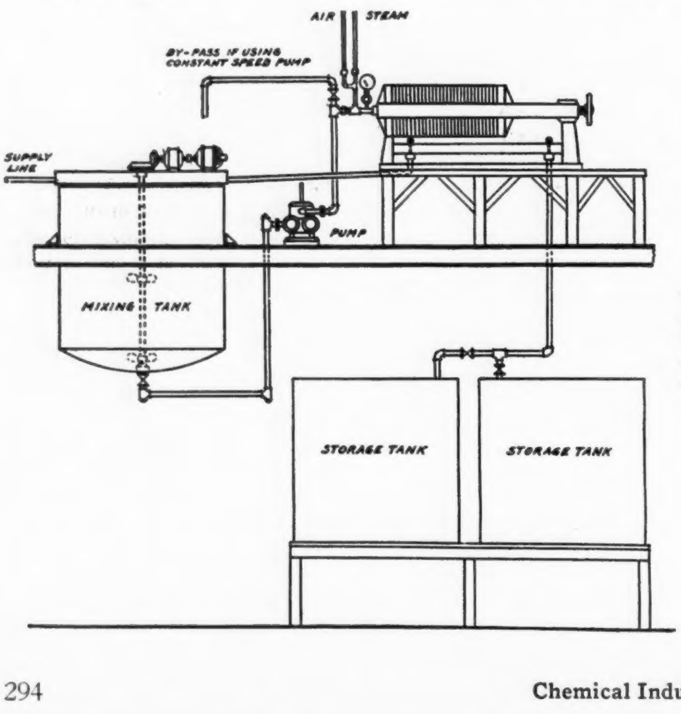
Achievements

Twenty years ago, activated carbon appeared on the American chemical industrial horizon as something as small as a man's hand, and the progress of its development, while painfully slow for years, was encouragingly sure. In recent years, the progress has been much more rapid as the merits and efficiency of the product were better understood and recognized. Without any blare of trumpets, this product has established itself in the purification field, to the extent that in many industries it is now an indispensable medium for maintaining the highest quality standards set by the Pure Food Laws and the United States Pharmacoepia. American living standards are the envy of the world, and particularly is this the case with the standards we have set for our food and drink. An advertisement appearing in the February 1940 issue of one of our trade publications carried the headline "In selling foods TASTE is always the final sales clincher" is truly a story in a nutshell. No other single product has contributed so much to the maintenance and advancement of these standards as activated carbon.

Even with the handicap of starting a full decade or more behind, our position in the United States is outstanding in respect to both production and consumption of decolorizing and deodorizing carbons, being double that of all of Europe. This, of course, is not taking into account gas mask carbon, of which so much, unfortunately, is at present required for war purposes and which type of activated carbon—as already stated—does not come within the scope of this article. There is a quality of decolorizing and deodorizing carbon available for every known use and application, and there is no doubt other qualities will be available, as and when required. Today, there are obtainable activated carbons at 5c per pound, which is a remarkable spread—economically speaking—from the $1 per pound for the imported product of twenty years ago, used then in very limited quantities for application to some few drugs and pharmaceuticals.

This expansion has not come so much from displacement of other mediums and other purification methods, but rather from the wider use and application of activated carbon, due to its greater all-round effectiveness, its positive action in literally grabbing and holding within its pores the various objectionable impurities with which it comes into physical contact and which are subsequently eliminated, along with the carbon, from the product treated. The simplicity of the carbon treatment is shown by the typical layout below.

As previously mentioned, activated decolorizing and deodorizing carbon has not only reached into the highways, but also into many of the byways of industry. A significant fact—and one worthy of note—is that approximately 85 per cent. of the total production in this country is used in plants where high standards of purity are demanded, if not imperative, i.e., in the food and drink destined for human consumption, directly or indirectly. These include: cane, beet, corn, and maple sugars; cane, corn, maple and sorghum syrups; honey; vegetable oils, including cottonseed, corn, cocoanut, linseed, olive, palm and palm kernel, peanut, and soya bean, lard and other animal fats; glycerine; gelatine; beverages, including wines, whiskey, neutral spirits, beer, cider and water; fruit juices; pectin; vinegar; organic acids (for soft drinks); dairy products. Other products successfully and economically treated with activated carbon include a long list of fine chemicals, drugs, and pharmaceuticals, many of which enter into medicines; photographic chemicals; sodium glutamate; milk sugar; tallows, greases and waxes; synthetic resins; plasticizers; plating solutions; dry cleaners solvent; caffein; dyes and intermediates. In the strictly chemical field, activated carbon has established its worth in crystallization processes, and its use is increasing as a catalyst.



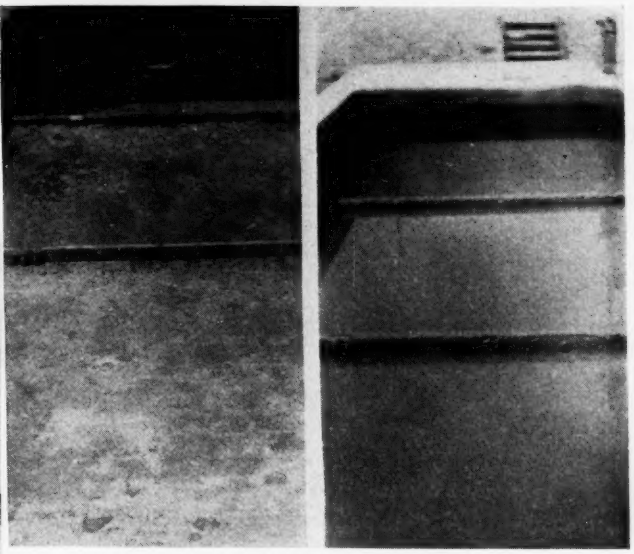
Typical layout for carbon treatment discussed by the author in text above.

Water Purification

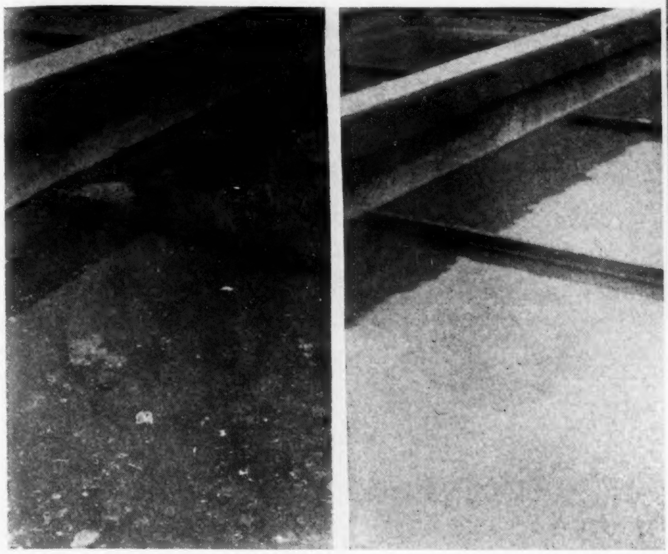
One of the outstanding achievements of activated carbon is deserving of separate and special mention, if only because its effect has reached literally into millions of American homes. This is the treatment of drinking water, for the control and removal of tastes and odors of an unpalatable and objectionable character. Notwithstanding this country is far in advance of the rest of the world in both water engineering and purification practice, until the arrival of activated carbon no satisfactory universal solution of this taste and odor problem had previously been found. Quite a number of different methods had been tried, but were all found wanting in one respect or other. The United States per capita consumption of water is tremendous, comparatively speaking, as shown by the fact that New York City, with a population approximately the same as London, uses three times the amount of water. On this basis, it follows there must be immense collecting areas and very large reservoirs. This serves to increase the opportunities for contamination which arise from various sources, mostly man made, plus a great deal of trouble from the sun's rays penetrating stored water in lakes and reservoirs, creating algae, which shows usually as a green scum and spells real trouble in the hot summer weather for the water plant operator. Obviously, any period of drought makes conditions much worse.

Back in 1930, a large part of the country suffered from a severe drought, when a bad taste and odor situation became

Right—Primary sewage tank toward influent without carbon treatment shown in left section of photo. Right section shows same tank with carbon treatment.



Below—Primary sewage tank toward effluent without carbon treatment at left. At right is shown same tank with carbon treatment.



desperate, particularly in the larger manufacturing cities where trade wastes added to the problem. It was at that time our organization initiated the use of powdered activated carbon for the purpose of taste and odor control in municipal water supplies—previous attempts to use granular carbon having failed, mainly for economical reasons. The success of the treatment was immediate, and the extension of the use of powdered activated carbon was rapid and continuous. Today, more than 1200 water plants in this country and Canada, alone, are using the powdered carbon, and the treatment has spread to all parts of the world.

It is only human nature to rebel at anything that tastes and smells badly, as anyone familiar with the safe, but chlorinated water, knows. People just detest bad-tasting water and, to avoid same, will often seek relief in some unproven well supply that is better tasting but dangerous to health. Such an experience has happened on more than one occasion, with serious loss of life. The use of activated carbon, in providing a palatable water, has reduced this risk to negligible proportions and so has proved a blessing to humanity.

Drinking water is probably the cheapest thing we buy, so naturally the question of the cost of carbon treatment is of more than passing interest and importance. Dosages differ considerably, according to condition, but a fair average dose, taking the country as a whole, can be set at 30/40 pounds of carbon per million gallons of water. Bringing this down to a percentage weight basis, the remarkably far-reaching properties can well be realized, particularly if you remember the statement made earlier, that there has been reliably estimated to be 20,000 square yards of external and internal activated surface in a cubic inch, and in a particular quality of carbon applied to water, it has also been scientifically calculated there are 120,500,000,000 particles to a gram. Can it be wondered then that the estimated cost of the treatment in an average community is no more than four cents per capita per year?

Carbon Is Versatile

Thus, it will be seen that activated carbon is most catholic in its sphere of usefulness and, in a sense, a regular "jack-of-all-trades," but without limitations. As an instance of its versatility, one can jump from its application for controlling food odors in domestic refrigerators and ice boxes to its use as one of the principal ingredients in chemical heating pads, and—believe it or not—a mild dose following a convivial evening with your boy friends will take care of that morning-after-the-night-before feeling. And, speaking of belief, or its correlative faith, is remindful of a story of the Japanese in San Francisco, who, years ago, wrote for some activated carbon because of a dream in which, he said, God had disclosed to him how to make diamonds, and he was looking for the purest and best carbon. Needless to say, no samples showed up as successful proof of the experiment.

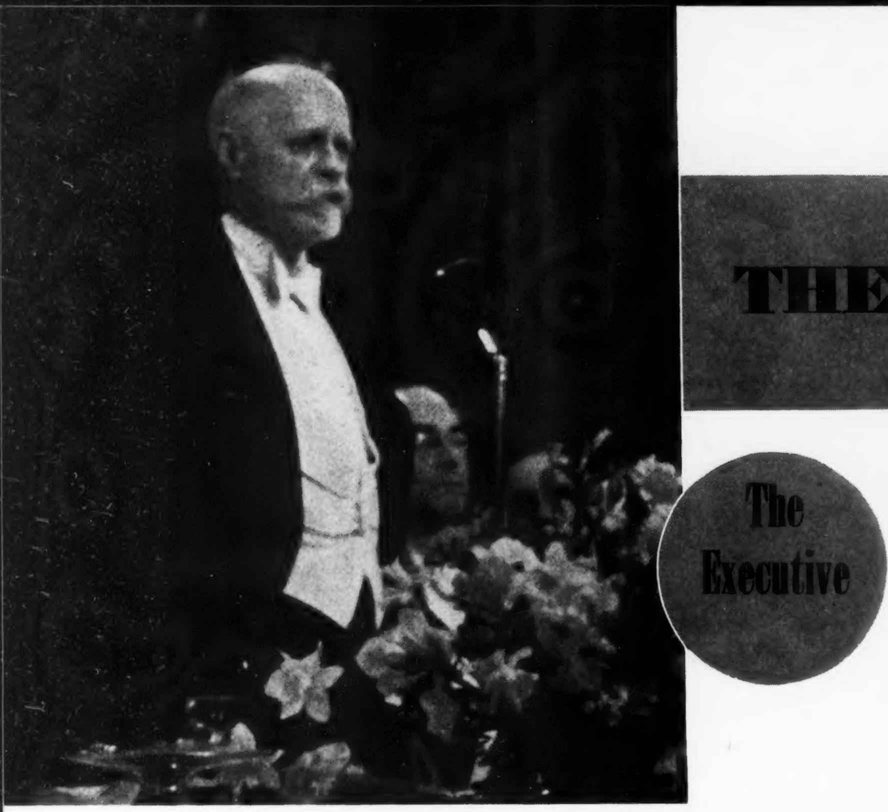
In such a relatively short time, definitely, activated carbon has done a remarkable job, as a purifying medium, in many diverse activities. It has excited a great deal of interest and research throughout the world, in respect to its potentialities in still wider fields of use, and there are positive indications of its serviceability in the direction of petroleum products, flotation of rare metals, air conditioning, as a catalyst, treatment of trade wastes and sewage. By way of conclusion it can properly be said—based upon experience—that the measure of success of such expansion further afield will depend a great deal upon the collaboration of the chemical engineer.

Checking Apple Scab

Experiments carried out in a McIntosh orchard in which a spray mixture containing nitrate of soda and mono-calcium arsenite and a spray containing "Elgetol" were applied to the leaves on the ground under the trees just before the buds had reached the green tip stage, indicate that destruction of the overwintering apple scab spores by this means may make possible the control of scab infections with fewer summer sprays which would be an advantage in carrying on a non-residue spray program and in lowering costs of production. *Agricultural Experiment Station*, Geneva, N. Y.

Bichromates in Wood Preservation

New wood-preservative mixture based on mercuric chloride has been developed by the Forest Products Research Board of the Dept. of Scientific and Industrial Research. The discovery followed the evolution of a standard laboratory method for measuring the relative resistance of wood preservatives to leaching from treated wood and the application of the test to preservative mixtures containing alkali bichromates. In many cases the results indicate that the presence of potassium or sodium bichromate considerably increases resistance to leaching of toxic preservatives of the water-borne type.



THE EXECUTIVE AND

The respective roles of "executive" and "technologist" in modern industry were superbly discussed at the dinner meeting of the American Section of the Society of Chemical Industries, held at Hotel

William B. Bell

President,
American Cyanamid Company

A CENTURY ago, when the chemical industry in America was young, there was little division between "The Executive and The Technologist." There couldn't have been. There were too few amongst whom to divide authority in those institutions that subsequently became famous under the names of Harrison, Cochrane, Grasselli, Kalbfleisch and others. When the Du Pont Company was founded one hundred and thirty-eight years ago,—at least so I have been told, the chief executive and the chief technologist were one and the same,—Eleuthere du Pont. Just how he divided authority with himself is not recorded, but obviously he reached "a proper understanding."

Today the Cyanamid Company,—far from the largest of chemical corporations, —has seven vice-presidents. If you think that large chemical organizations do not need many executives, let me introduce the subject,—The Executive and the Technologist—by reminding you of what an executive thinks about.

Well, in these enlightened days, an executive frequently goes to bed dreaming that his largest plant will be picketed tomorrow morning, and frequently wakes up to find that his dream has come true. Or he may face an increase in taxes and the problem of what, if anything, can be done about that. Or the price of foreign imports for which he has contracted may now call for more dollars than he anticipated, because the gold content of the dollar may have been lowered overnight. Or the exports which he loaded in a German bottom for shipment to Hamburg may have been diverted to Mexico, because Germany is at war with England. Or perhaps essential imports are detained in The Downs or The Orkneys or at Gibraltar. Or his manufacturing operations may need to be revised because a new wages and hours law is taking effect shortly. Or one of his largest customers may be going to mine or otherwise produce his own raw materials because the Robinson-Patman Act makes impracticable a satisfactory price on large quantity purchases and thus this customer may soon be added to other competitors in this field. All of these are matters calling—yes, crying,—for executive consideration.

But these are the developments of new trends in the political world. Even before they began, the executive had plenty to think about. Though he kept clear of the details, he found broad business policies awaiting determination. Should he take on lines for new industries? Should he complete lines to satisfy customers buying his special products? Should he mine or buy more of the raw materials that he himself needs? Should he manufacture the intermediates? Are his by-products worth utilizing? Shall he try to benefit his people by maintaining employment in off-seasons or will he thereby risk excessive inventories that may conceivably embarrass the company and leave some of his workers with no jobs whatever?

Even though the Executive were himself a technologist, the need for competent technicians to keep the chief executive's desk clear of scientific problems is plain and also the need for other executives to carry out the many administrative programs. For example, the treasurer, one of the most important of all executives, supported by able division heads, must produce dependable figures relating to production, costs, taxation, physical conditions and scores of like matters. Selling goods and not getting paid for them is perhaps the shortest of roads to bankruptcy. And so the treasurer must have a credit subdivision in charge of a first-class man. Nowadays, numerous laws and regulations demand, in addition to these essential statistics, another executive and staff to prepare countless reports on every conceivable corporate activity. Operating in most of the states of the Union, we must produce every year more than 1500 such reports for government authorities, or an average of more than five per working day.

Less clear cut but equally fundamental are the broad problems of financing. Replacements, new plants, large research programs, expansion into new industries,—all these and many more involve new money. Money is a commodity found only in competitive markets. At some time almost every growing company must bid for it. The treasurer and his associates furnish fellow executives with information as to probable needs over a period of years,—how much the corporation can af-

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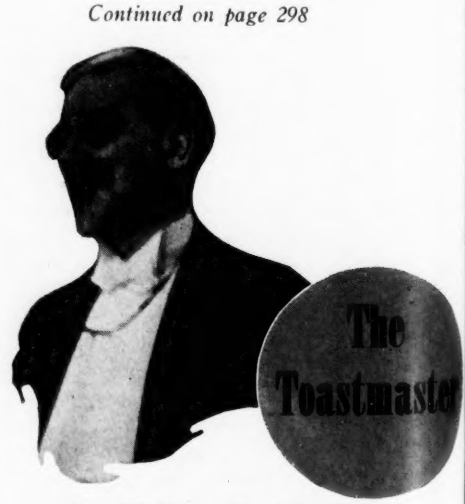
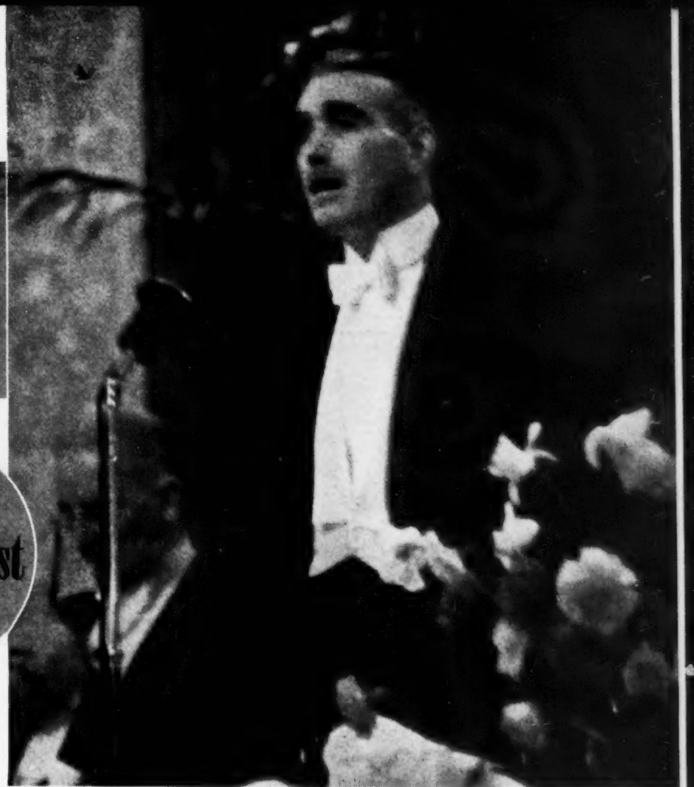


Dr. Wallace P. Cohoe

THE TECHNOLOGIST

Biltmore, New York, February 16, by two outstanding leaders in these respective fields of endeavor. Read what the "executive" asks of research and what research seeks in the "executive".

The Technologist



Dr. E. C. Williams

Vice-President

Shell Development Company

A distinguished writer has recently referred to science as "at once the noblest flower of the human mind and the most promising source of material benefactions," and if I understand my task it is to consider how unity of outlook can best be achieved between the scientist and those most interested in the material benefactions. It is certainly true that there must be complete harmony between them if the greatest results of their union are to be secured.

I will assume that the word technologist does not include the army of technological experts who keep an established industry running—for there is no question as to their function nor any failure on the part of executives to appreciate and promote their work—but those, fewer in number, whose job it is to steer industry into new channels either by the improvement of existing manufacturers or by the creation of new products and industries. It is those research workers—chemists, physicists and engineers who have become both creative and disruptive forces of industry who are regarded by executives, according to their individual tastes as either their greatest hope or their greatest embarrassment.

The more perfect understanding between executive and research minds is a study not only in industrial planning but in the psychology of individuals. There is no more a golden rule here than in happy matrimony, unless it is mutual understanding, tolerance for different ways of thought and respect for the contributions which each can make to the common good.

It is unnecessary for me to describe what research has already done for industry, the record of the last 20 years in this country alone speaks for itself. Research has become a household word, an industrial fashion, its achievements are acclaimed in the daily and monthly press.

More than $200,000,000 were spent by United States industry on research in 1939. The average expenditure on research by U. S. manufacturing industries during 1938 was equal to .5 to 1.0 per cent. of net sales revenue; five recognized leaders of chemical industry with combined sales of above $450,000,000 are stated to have spent $12,600,000 on research (2.8 per cent.).

No one doubts that in principle research is vital to modern industry but it takes the active cooperation of many minds in many departments of any particular industrial organization to ensure that the principle is made effective.

It is apparent, your Chairman wrote to me, that executives, as representatives of capital, and technologists do not speak the same language and consequently misunderstand each other. "The technologist *thinks* the executive considers money only; while the executive *tells* the technologist that he is too theoretical." I would ask you to note a distinction in words there—the technologist "thinks" but the executive "tells."

I do not imagine that his choice of words was anything but a coincidence yet it happens to illustrate what is perhaps a real factor in our problem.

Of course, none of us doubts that the executive thinks as acutely as the scientist, yet we may recognize a certain absolute value in what he *says*; a value arising unavoidably from the prestige and authority which surround his office. This is an important matter when it is allowed to cloud real issues, and can be a dangerous one. Let us examine it more closely.

A statement or a wish expressed by a president or top executive may acquire an *absolute* importance by the mere fact of it having been expressed by him; in many cases the expression of a belief—with all reserve—by a sufficiently influential executive tends to make that belief a *fact*. For example, if the president of United States Steel said he thought steel was going up, it very probably would go up.

What might have had little real basis for happening before he spoke becomes a fact because he spoke. A lesser person could not produce that effect. Thus the mind had created an actuality. In a less extreme degree that sort of thing happens quite a lot in commercial organizations and may easily lead to unnecessary misunderstandings when executives deal with scientific and technical affairs.

A good executive has the gift, after hearing many sides to a question, of sifting intangible factors and arriving, sometimes apparently by intuition, at a decision. Sometimes to his colleagues his decision seems hastily or casually arrived at, sometimes they think it crazy. But if in course of time his decisions prove correct often enough—if his batting average is high—he quickly becomes accepted as a great executive—and he is.

But remember!—the more he is accepted as a great executive the more, as we have seen, do his beliefs tend to influence facts, or even become facts, merely because they are his beliefs. So his chances of proving right increase in geometric progression as his reputation increases. His prestige is self perpetuating; it grows so to speak on its own fat.

Now that is a dangerous state for the executive to be in; as it is for a dictator. Unless he is essentially modest, progressive, and receptive to new ideas. he becomes the epitome of established

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ford to pay and what the price is likely to be. Men in this department who can, not only add and subtract, but tell us also what the figures mean and what trends they indicate are invaluable. If they can also predict the purchasing power of the dollar,—if, in the present state of Government finance, they can foretell whether the corporation five years hence will need one dollar or five dollars or twenty dollars to pay for a single dollar's worth of materials, labor or equipment measured by prices in current markets, then they are indeed priceless members of the executive group. For guidance a transaction in international exchange, a seventh son of a seventh son would, I suppose, be the type of man best equipped. May I suggest that he would have an advantage over the man with more technical training.

Makers of the Budget

Small in numbers, but exceedingly important, are the gentlemen who plan the budget. They obtain from each division of the business estimates of sales and costs, summaries of capital requirements, calculations of interest and amortization, approximation of taxes, overhead and all other expenditures and predict the cash position month by month throughout the year and, in a general way, for several years to come. Having done this, they check monthly the actual expenditures to be sure that there are no overruns. In times like these this plotting of future cash positions is no mean undertaking.

No less necessary to a complete executive staff is someone responsible for the legal and semi-legal problems of the corporation. For years Americans have been in the habit of attempting to legislate away all ills. The Nation, the forty-eight states and hundreds of municipal and other authorities pass annually thousands of laws and ordinances, any one of which may seriously affect business. In the last few years the grist from these legislative mills has grown ever greater. To this output have been added myriads of decrees of innumerable administrative bodies. Furthermore, instead of leaving to impartial courts the administration of these ordinances, we have, in many instances, bodies, each of which, in itself, constitutes legislative, prosecuting attorney, grand jury, judge, jury and executioner,—"all rolled into one." To deal with these complex situations, we have been compelled to double the number of persons included in our legal and related divisions.

How many people, not actually in touch with the work of the Purchasing Division, ever give thought to the vital part it plays in the success of the business? When shall we build up—when reduce inventories,—raw materials? finished goods? When shall we buy spot? When make long term commitments? For what measure of customers' demands six months from now must we prepare?

The selection, management and other problems of our personnel have so increased as in themselves to require an executive department. The fearfully erroneous arguments of the technocrats may still deceive some persons; but you, of course, realize the necessity for such a department because you know that with invention, labor saving, lower costs, increasing efficiencies and the greater markets that follow, employment in our industry has grown and will continue to grow by leaps and bounds far faster than the Nation's population. A hundred years ago our industry employed fewer than nineteen hundred persons. When I was interested, in NRA days, in organizing the Chemical Code, those employed numbered more than 106,000, and yet we excluded explosives, rayon, fertilizer, drugs, naval stores and several other clearly chemical activities which had their own codes. Under the broader classification the chemical industry in 1933 employed about 260,000 as against 2,300 in 1840. With this immense increase in employees have come problems of labor relationships, safety measures, first aid, occupational diseases and many others.

I need not mention problems of production. We all have our mining engineers, our electrical, power, metallurgical, mechanical and other experts. The control of our processes and reactions by chemists and chemical engineers is, of course, fundamental. We maintain departments, too, for the design, construction, main-

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authority, sometimes of conservative unimaginative authority.

We need not alarm ourselves too much by looking for examples within our own experience but how quickly do we recognize in other walks of life in some of our academies of art, governmental bureaus, in the church, even in some of our older universities; the powerful influence of vested privilege operating to stifle progress and healthy change; or, if you prefer it, the cautious influence of responsible authority shrinking from ventures over uncharted ground.

It is easy to see how this attitude of mind may clash with that of the research worker. It is the latter's task to create new things. He deals with things yet unproved; he is always weighing risk of failure against promise of success.

He too like the executive has his intuitions; his too are sometimes crazy; and his too sometimes prove correct. The more often they do, the greater becomes his prestige.

But, and here the difference begins, the beliefs or intuitions of the research worker never at any time have the slightest influence on the facts. Neither do they from the fact of being expressed by him acquire the slightest actuality,—whatever his prestige or authority. His own most junior laboratory assistant may, by well directed experiment, prove him, acquire the slightest actuality,—fallibility tends to breed a scepticism in the scientist's mind for vested prestige or accepted beliefs as such,—including his own.

It is a pity when executives, meeting such scepticism or disbelief in established authority, which is one of the most essential characteristics of the productive scientist see in it only a *lese majeste* or a reluctance to pull along like a decent fellow—"just like the rest of us do."

Until the time when more executives in modern industry are recruited through the technical or scientific departments there must be an interim during which the research leader and the more traditional type of executive with financial or sales or legal background will have to make conscious efforts towards mental adjustments. But that should not be difficult to intelligent men. The platitudes that executives think only of money and that research men are theoretical and impractical are signs of adolescent thinking or obstructive conservatism. There are, of course, individual examples to support both statements but modern industry does not depend on them.

The executive of today devotes a large part of his thought to the understanding of the basic processes of his industry and the research leaders who come into contact with the executives are persons of broad background with sufficient knowledge and sense to understand and appreciate the problems of executive control.

There are, however, some differences between the backgrounds of the executive and research types and the conditions surrounding their work. The problems of a top executive are concerned largely with financial, organizational, commercial and political affairs, and increasing with labor relations. These are primarily problems in human relationships. His technique must include a native gift for leadership, power of persuasion, of estimating intangible probabilities; willingness to compromise difficult issues, exercise of personal will or determination where compromise is impossible. At all costs the machine must be kept working smoothly and to that end all discordant or strongly individualistic policies tend to be suppressed.

The research leader on the other hand while needing the same characteristics as the executive in his dealings with men (and no one has more complex human relationships to handle than the leader of any large research group) is vitally concerned also with coldly material things, chemical reactions, properties of matter and forces of nature. No amount of personality, persuasion, or will, can influence such forces; neither is it possible to compromise them for the sake of peace and good fellowship.

If the scientist compromises on something for which he should have data, his mistakes like those of the doctor remain starkly to condemn him. The ghosts of the executive do not rise so quickly; if he is smarter than those around him they may not rise at all; it may never be known that there are any ghosts.

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tenance, improvement and replacement of our plants.

I am frequently impressed by the work of our technicians in packing and shipping. Not only must our goods be transported in safety and arrive in sound condition; but customers must be pleased. We service all industry. The resulting problems are innumerable.

Amongst the most vital of our divisions is the Traffic Department which, in addition to its many other duties, strives to protect us against rising transportation costs and even to secure for us the benefit of lower rates. Did I say to secure "for us"? These benefits are almost invariably passed on to the buyer and, in these days of fierce competition, soon reach the ultimate consumer.

Matter of Distribution

I am not attempting a catalog of all the activities of a chemical organization. It would be absurd, however, for me to omit distribution. The chemical industry of America includes the highest types of selling organizations to be found in the world. Selling chemicals is not ringing door bells. Our salesmen are largely technically trained men, familiar with our products and their application. Highly trained service men supplement these efforts,—men almost as familiar with the consumer's processes as he is himself. And many of them are diplomats so highly trained that the consumer never awakens to this fact! Furthermore, these sales and service contracts add new customers and reveal new opportunities for expansion in applications and customers' needs heretofore unsuspected. If these salesmen can throw light on economic trends within the industries they serve, so much the better. Alert minds, coupled with sound curiosity, are at a special premium in this division.

I might go on with other divisions of a chemical organization's activities; but already, you have seen represented every letter from A to Z in industrial activity. In each of these divisions of the modern chemical company, the technologists appear in varying proportions. True they figure but little in the Legal Department. (But perhaps you have met lawyers who have seemed to you a bit technical!) But the technologists proper, design the plants, the replacements, the repairs. They dominate manufacturing. They draw specifications for the Purchasing Department. But why cumber the records with details? Their knowledge and sound judgment are invaluable in the whole corporate set-up.

And now I come to that great and vital activity of an ambitious chemical organization,—that activity in which we trustingly expect the research technologists, to take us by the hand and lead us over mountains, through valleys, around deserts and past pitfalls into the promised land. Our stockholders and bankers expect us to keep in business and pay the rent for the capital they have furnished. We must not die of obsolescence or old age. We must maintain in our back yard old Ponce de Leon's Spring of Everlasting Youth. We in turn look to technologists to keep our present products sold, to bring them down to date, to find further uses for them and to invent new products as well. Technologists must keep us ten jumps ahead of public need and our competitors. Remember, please, that technologists must tell us what the public desires long before the public itself knows.

Millions Spent In Research

When I think of the many millions spent in research by the Bell Telephone Company, the Du Pont Company, the Carbide Company and other companies, and of the successes with which their efforts have been attended, remarks from me on this subject seem an impertinence. The American Cyanamid Company is paying for research something more than two million dollars a year which, in comparison with the companies just mentioned, makes us look like "pikers!"

However, that is a large sum to Cyanamid and I have been greatly interested—at times painfully interested—in this part of our business. Perhaps you who spend the money for research may at least be amused by some comments from a layman who helps raise a little of this money.

When first I became one of the policy determining factors of the American Cyanamid Company, we were a fertilizer manufacturer. The fertilizer business is an important business, a worthwhile business, a beneficent business—yes, even at times a philanthropic business! It is subject to all of the depressions of ordinary business. On top of these, it has special depressions of its own. In other words, it is a business that depends on agriculture. The farmer has, of course, more depressions than the rest of us. However, I might add that, if the politicians would let the farmer alone, he would at least no longer be in a perpetual depression!

The fertilizer business of the American Cyanamid Company was depressed in the early 1920's. Its phosphate rock mines in Florida were shut down. Its "Ammophos" plant on New York harbor was shut down. Its cyanamid plant at Niagara Falls, Ontario—then one-fifth of its present capacity—was operating at fourteen per cent. of that earlier capacity. That was all—there wasn't any more—and any

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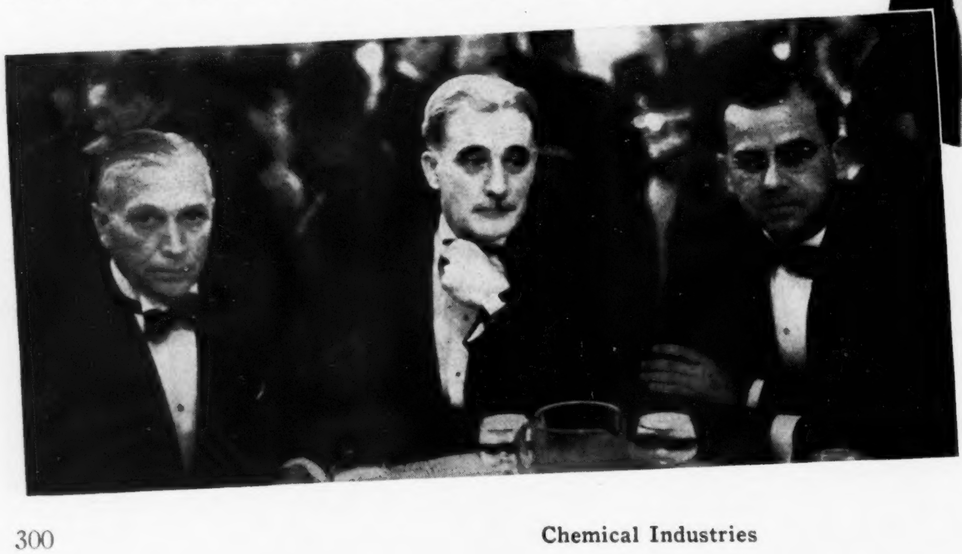
Above—Francis P. Garvan, Jr., president, Chemical Foundation.

Left to right—J. F. Fredriksson, vice-president, American Cyanamid & Chemical; Arthur J. Campbell, sales manager; and K. C. Towe, treasurer, same company.



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It is a pity that we often find scientists arguing for the sake of precisely defining what they believe to be established fact, to the obvious boredom of the executive who is accustomed to seeing differences of opinion "adjusted" by happy compromise or arbitrary decision from above. Often the argument is not worth the fuss; the facts will come out in due course anyway and the executive, who is by assumption a reasonable fellow, will gladly change his mind to meet any new situation. Scientists should allow for this transition to take place by methods acceptable to the executive mind and not try to force it by reiterated argument. They should remember that they do have the executive out on a limb to some extent if he is not himself a scientist; and if he cannot understand what they are talking about it is, after all, partly the scientist's fault.

It is a pity too that scientists so often battle amongst themselves on technical matters where differences of opinion as to the facts are permissible. The executive often thinks this indicates a serious rift between his advisors or a quarrel-

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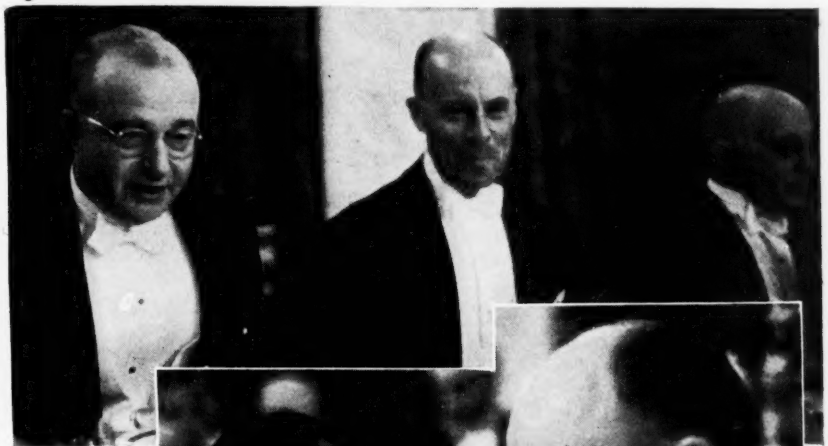
Dr. James G. Vail, vice-president and chemical director, Philadelphia Quartz.

Below, left to right—Thomas Midgley, Jr., vice-president, Ethyl Gasoline Corp.; Thomas H. Blodgett, president American Chicle Co., chairman of the board American Writing Paper Corp.; Dr. Frank B. Jewett, president Bell Telephone Laboratories, Inc.



Above, left—Rev. Francis W. Power, S.S., Fordham University; right, G. S. Kimball, Honorary Secretary, American Section, S.C.I., and connected with Foster D. Snell, Inc., Brooklyn consultant.

Below, left—H. L. Derby, president, American Cyanamid & Chemical; right, R. C. Gaugler, vice-president of Cyanamid.

H. Jacobson, director of Royal Dutch Shell.

Left—Dr. Joseph W. Barker, Dean of Engineering, Columbia University; right, Dr. J. V. N. Dorr, president of the Dorr Company.

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fool could see that what we needed was diversification.

Fortunately the company had been most conservatively handled. Its financial affairs were in excellent order. Cash had been conserved. There were no bad debts to write off. In an orgy of farm credits, the company had followed the teachings of its dominant stockholder—an eminently wise and prudent man, the late James B. Duke—whose idea of a good fertilizer credit was a sight draft attached to the bill of lading. Any one else should pay cash in advance for both goods and freight.

Thus, as I have said, the need of the Cyanamid Company was diversification. At first we undertook diversification by the research route. This is not so simple as it sounds. For a time we made rapid progress. But pretty soon I began to realize the truth of what an old Quaker gentleman once told me that—to use my words, not his—it took him, on the average, nine years from the time he "had the idea by the tail" until it was "out of the red."

Seems Like Nine Years

It has not always taken the Cyanamid Company nine years to make money out of a new idea; (but it has not infrequently *seemed* like nine years!). Here I should point out, however, that research, designing, manufacturing and sales introduction are not the only causes that contribute to the nine years. Not infrequently financial resources forbid that all projects be pushed abreast. Priority is given some and others, of necessity, deferred. Today many projects hesitate because of general business uncertainties, quite regardless of the merits of the projects themselves.

The mere finding of satisfactory ideas on which to work has sometimes presented a very real difficulty. Here are some of the methods we have used in locating these ideas:

1. We made up charts showing the derivatives, actual or theoretical, of all our basic products,—such as phosphoric acid, cyanamid, cyanide, etc., etc. We studied possible uses for these derivatives. We still do! But I regret to say that not so many ideas for research have come by this route as I would expect.

2. We have asked our customers what they would like to have. If they could have a chemical compound invented for the asking, what properties would they like it to possess? It may amuse you to know that even the most unhappy customers in those early days had little idea of what they really wanted. Today that attitude is somewhat changed. A number of our customers now have research departments of their own. Sometimes these research departments have found the desired chemical. In more cases they have worked out at least a fairly definite statement of their need. This helps us to help them.

3. Another source of ideas for research is "trouble shooting." "Trouble shooting" seems sometimes the furthest removed from pure research. I admit that I cannot accurately define either. I have heard the statement that pure research is the kind that pays no dividends! On the other hand, Dr. Kettering has said that pure research is the kind that looks financially hopeless now but in twenty-five years pays the biggest dividends of all. In fact, Dr. Kettering has been so unkind as to liken those of us who grow uneasy about our research bills to parents who expect the nine months old baby to support himself! And we must admit that Dr. Kettering's works justify faith. But certainly pure research is neither quick nor cheap. On the other hand, of all the hopeful ways for an alert research organization to achieve new and immediate results, I suppose the complaints of customers about the failure of products to do the tricks for which they were designed afford the most obvious starting points. I might add too that, sometimes, the answers to these complaints lead into pure research.

4. Meanwhile, under vigorous competition, the prices of our products, both new and old, were,—they still are—falling, our profit margins were growing narrower and agricultural depressions were no less frequent. It was obvious that, while we continued the development of our own research programs, we must gather in more projects—particularly ideas partially developed—and speedily reduce them to practice or our profits would largely disappear. We surveyed the horizon for other companies who had ideas in various stages of development, but who needed money for their own research or for plants in which to make new products or for sales organization or business expansion. In such acquisitions we have been fortunate. We acquired such companies as the Calco Chemical Company, the Kalbfleisch Company, the Lederle Laboratories and the Chemical Construction and Nitrogen Engineering Companies. We greatly enlarged their operations and enabled them to carry out their ambitions. In doing this, we acquired many additional leads for research.

5. At first not many new inventors came our way. This was largely because we were not well known. Partly too, it was due, no doubt, to our policy towards inventors. We have always refused to discuss their ideas with them until they have protected themselves legally with appropriate patent procedure lest they disclose something that we had already developed and thus create an embarrassing situation. Now it is a dull week when no inventor brings something of interest both to him and to us.

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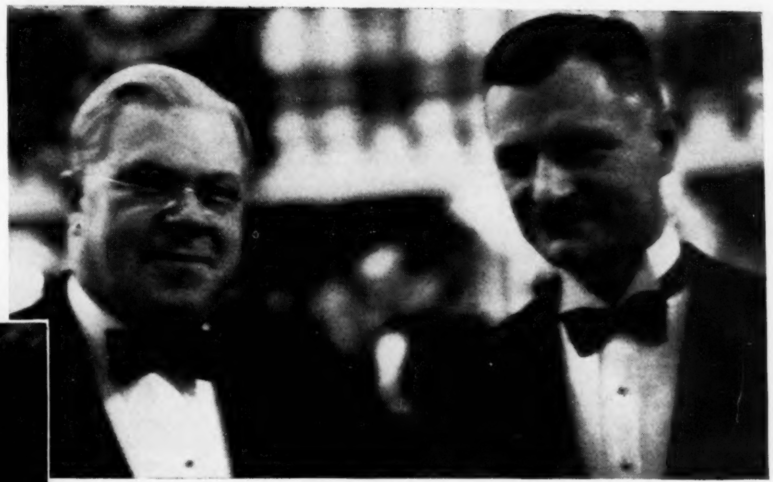
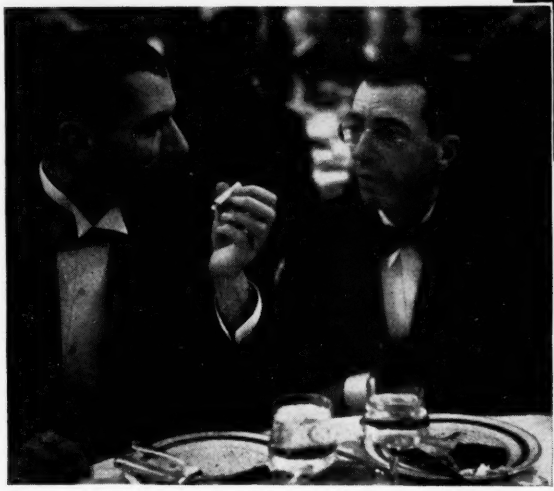
Left to Right—Prof. Arthur H. Radasch, head of the Chemical Engineering Department, Cooper Union; Dr. L. W. Bass, assistant director, Mellon Institute; Foster Snell, instructor, Brooklyn "Poly"; and Dr. Raymond J. F. Kunz, assistant professor of chemical engineering, Cooper Union.

At the right—Walter S. Gavan, head of the Insecticide Division of Cyanamid and Chemical, and Philip M. Dinkins, vice-president of the same company.





Left—C. J. Romieux, Beetleware Division of Cyanamid, and Carl Hazard, president, Hazard Advertising Agency.

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some disposition (which he abhors), not realizing that it is really only a technical debate in which neither side's personal prestige is at stake—because neither recognizes personal prestige in such matters. They are really just enjoying themselves like lawyers do at times; but it does bore the executive sometimes to have to listen to it. The latter would naturally like full agreement between his technical advisors, at least on technical matters, but therein he is the impractical optimist. It is one of the rules of the game that there are technical facts which cannot be established or predicted in the laboratory, and these may have to wait on large scale commercial operations for clarification.

Just as the executive must, if he is to get full value from research in his organization, recognize these aspects of scientific work, so the research leader must gear himself with those on whom he depends for the constructive application of his work in industry. The research leader must be a salesman, selling ideas, things which cannot be seen or handled, things, which to his colleagues at least, are somewhat speculative and intangible. That requires good salesmanship even when there is no sales resistance.

The research director is a kind of crystal gazer to industry, without the hocus-pocus. The picture in the crystal for a year ahead is rather clear; further into the future it may be blurred, yet formed in its main outlines; even up to five or ten years ahead dim forms can be seen through the fog. These are not unsubstantial dreams; they are definite indications of future movements in industry.

I suppose the ideal executive from the research leaders' point of view is one who, whatever his original background, be it finance, commerce, sales or production, will analyze keenly and objectively the many factors of a new situation in an attempt to appraise their bearing on the future and not attempt always to fit new conceptions into some ancient pigeonhole of the mind bequeathed to him, perchance, by some revered predecessor and since worn smooth by continued effort to fit every new proposal into it.

Old vs. New Ventures

There are so many principles which applied to an established concern are the essence of sound business but which applied to new ventures can be extremely stultifying. It is impossible to forecast the future with the precision that one can record the past, and the purely accounting mind is inclined to attempt that or to shrink away where he finds it impossible. Did Perkin estimate his payback time when he established the first synthetic dye factory? Did Deterding draw back when he found he had to forego his own salary to pay his workmen during the early expansion of his company? Or was there an element of the old frontiersman in any of these people; a recognition of risk but a high determination to go forward in spite of reasonable risk.

I have had the privilege of knowing many and working with some of the greatest industrial executives here and abroad; I could tell you personal stories of their various methods but instead I will quote from a published account, of the building of a new successful industry in the United States.

He says:—

"To be true we had not yet provided for raw materials, markets, financing, engineering, operation, accounting, shipping and a few such items which have occupied the time of several highly competent men for the last fourteen years; but we thought we were ready to go.

"I have since always admired the patience and courage of the business men with whom I had become associated, in not taking the easy way out and proving as could easily have been done on the basis of the incomplete knowledge then available that the propositions were not commercially feasible.

"Instead I found in these successful practical men an enthusiasm to extend scientific discovery to industrial application and a degree of courage to assume the substantial risks involved that was a great revelation to me.

"The successful outcome of our plans depended on the successful integration of many further types of ability, (administration, engineers, metallurgists, lawyers, sales). The five years we spent on this phase of the work brought us no tangible profit and no prospect of profit until the units we had worked over so long were junked and further heavy investments made."

That is typical of the way that new developments may be expected to mature and is typical of the constructive share that falls to the lot of other branches of the industry, when research has to be developed to commercial success.

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6. Sometimes new ideas fail to come from any of these sources. Chemists familiar with the art, for example, can think of no new applications for a given product. A possible solution for this situation—we have tried it, but not frequently—is the establishment of fellowships in university and other laboratories not too familiar with that particular field. The theory is that to a stranger may occur an idea so absurd that no orthodox worker in that field could entertain it. And yet once in a blue moon, there may be something even in such an idea. For a brilliant young graduate student working on his thesis under the direction of a competent department head or dean, $2,000.00 may cover fellowship and materials for a year and turn up just what is needed. You may even multiply this small probability of success by setting up half a dozen such fellowships in half a dozen universities for, say, ten to twelve thousand dollars. This is expensive business if tried on too large a scale and is a long shot in any case. But occasionally it works.

7. And while I am dealing with aids to research, let me mention another source of ideas—research by injunction. I recall but one instance of this kind, but it was amusing. When we bought the Selden Company of Pittsburgh, that organization was using the mercury vapor process for the manufacture of phthalic anhydride. It had been claimed that this was an infringement of the Downs Patent and Selden was being sued. Much to our surprise and distress, a court of final jurisdiction upheld that view. An injunction issued. You have heard the old saying that necessity is the mother of invention. But for speedy invention commend me to an injunction. Selden's research director in an amazingly short time invented a process that completely did away with the use of mercury in any form and produced phthalic anhydride at less cost than before! We sold the mercury and that helped pay for the litigation.

8. Medical research is a problem in itself. You can hardly hope to rival the great funds established for research in cancer or other similar philanthropic ventures. On the other hand these foundations, medical schools and hospitals are generally most cooperative. To them Lederle owes much—for example, for aid in the development of our sera for pneumonia, one for every type. Without mercenary motives, these institutions effectively cooperate in ways beyond the scope of commercial enterprise.

9. Our great scientific laboratories and schools also stand ready to aid research. Some of them possess laboratory equipment used too infrequently to warrant purchase by the ordinary research organization but occasionally of invaluable assistance.

10. Much might be said on the by-products of research. The by-products of a program may prove more important than the original objectives. The detection and utilization of these by-products demands constant watching by research directors, for these opportunities frequently call for the setting up of supplemental research programs, which sometimes expand in geometrical rather than arithmetical proportions.

Worthwhile Ideas Scarce

I have enumerated only ten of many ways by which we gathered ideas for research. (I may add that now more and more of our ideas originate in our own laboratories and the trend in this direction appears to be on the increase.) But, from this account of our experience, you will perceive that in my opinion one of the most difficult and vital things in research is finding of sound, worthwhile ideas on which to work—projects concerned with basic industries so that if these projects are successful, they can pay the profit necessary to reimburse the costs which real research involves. Cyanamid has been fortunate in that the leaders in its research organization presented that rare combination—scientists with vision to foresee the broad trends in industry as well as ability to make their dreams come true.

Perhaps the next great difficulty in research is to recognize that most ideas must inevitably go wrong. Unless you are prepared to view these failures with equanimity, unless you can face setback after setback without surrender, you had best not start. On the other hand, equally difficult is it to devise the machinery to determine which projects are worth pursuing and when the time has come to abandon any particular project.

In a general way, you may compare a comprehensive research program to a race with, say, one hundred horses starting. Perhaps thirty-five ideas entered will be scratched before they go to the gate. Even this is expensive. In Cyanamid, we attempt to do this scratching in this way: A new project, theoretically at least, is turned over to the New Projects Committee. This Committee gives the idea the "once over." I urge this Committee to approach each project with an open mind. Indeed, the mind of the Committee should be so open that, though the idea be impractical or even absurd, they can view it without prejudice, and if at all possible, whip it into shape. There is a slight tendency amongst you chemists—if I may be allowed to say so—to turn thumbs down on an outside invention which on its face appears impracticable and to feel that whipping the idea into shape is the inventor's job. And, may I add, some of you find it difficult to look with sympathy on any project that has once been tried and failed. From time to time our Research Department selects a man believed to be most open-minded and gives him the job of reviewing projects which we have in past years abandoned in order that he may, in the light of new processes and equipment available, lower raw material costs and other considerations, determine whether or not any project should be tried out again.

On the other hand, I must and do admit that new projects sometimes receive a degree of attention which they do not merit. Some schemes are so attractive that it is difficult to realize that they depend on situations relatively short-lived and do not, therefore, justify permanent investment. In the present state of the world, mistakes of this kind are easily made and may prove serious. Other projects are frequently meritorious in themselves but not suited to development by the particular company to which they are presented. We may not have a sales force covering the trade to which their products must be sold. Future profits from these products may not justify the establishment of a new sales division, even though it might fit in nicely with some other company's line. Of course, we all know the lure of the scientific toy that can by no conceivable stretch of the imagination justify the cost of its development. And yet this lure is not always resisted.

Small Margin of Profit

Occasionally I hear criticism of a project on the ground that it involves too much capital investment. If the profit margin is small, this may constitute a valid objection. But if it carries with it an attractive profit, the executives of any well organized company should usually be able to find the capital needed for its development.

With all these considerations in mind, need I repeat that a huge amount of effort and money is wasted every year by the use of hit and miss methods for selecting research projects. To these difficulties I and perhaps other laymen as well contribute by our bright ideas and enthusiasms! But in principle we know that the chances of success in research and development to the point of profits are greatly improved by careful selection and direction.

But to go on with our system: If the New Projects Committee recommends consideration of a new idea, that idea is turned over to the Research Advisory Committee and to a committee of the Sales Division in order that the former may determine whether manufacture is

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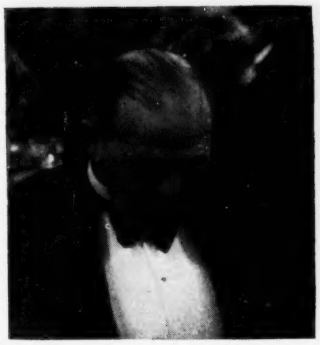

Group of Cyanamid Officials—Center, E. V. O'Daniel, vice-president; left, Howard R. Huston, assistant to the president; right, Dr. Walter S. Landis, vice-president.

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I have had so much help from the highest executives with whom I have associated and seen so much wisdom in their approach to difficult problems lying outside the current operation of their industry that I am tempted to emphasize the particular influence of the top executive, without which very often no progressive research could be done.

Strangely enough that influence is intangible rather than specific and human rather than purely factual and logical. That may seem contradictory to those who regard technical advances as arising from the slow logical accumulation of data. In truth, the research worker needs more hidden springs of courage and faith in future success to support him than almost any other worker.

Successful research will only be done when someone starts by intensively believing that something can be done. For each step successfully accomplished there are usually many steps that fail and so it goes on to the end.

It is often difficult to tell even after a venture has proved successful at just what point success was assured. It is much more difficult to tell while you are still in the middle of things.

That is why it is so extraordinarily difficult for a research worker to say with definiteness, while he is yet on the way, whether he will ever arrive, or when, or what he will have when he gets there.

And that is also why it is so easy for people, other departmental groups for example, Treasurers, Sales Managers, Production Heads, Budgetary Officers, Administrators, to expose with such clarity the risks or uselessness of going on.

There are always more uncertainties or evidences of potential failure about a new project in its early stages (in later stages too) than there are evidences of success. Therefore, by spot-lighting the difficulties more than the potentialities, or even without any particular spotlighting, the picture can be made to look unpromising enough to warrant abandonment. There is no personal risk to people who look at things in that way, the betting anyhow is that most really new ideas will be failures, so on the average the negative opinion is likely to be right; even if it is wrong it may never be proved wrong because if it prevails the project will not succeed anyway.

"Cautious Practical Men"

You may usually find such cooperation sailing under a banner dedicated to "cautious, practical business men": the slogan on the banner, "we are in the game for money" or perhaps "what about the stockholders?"

And you know those slogans are so awfully hard to combat. They are such dazzingly brilliant expositions of eternal truth that the research man feels slightly moronic by the fact of their having to be explained to him.

There is no answer to that except the jingle of hard cash and the profits rattling in and that answer is not likely to be reached under such conditions because the necessary cooperative steps to achieve success could never be taken.

I deliberately painted an extreme picture—which is none the less real—the more usual case is that, would-be cooperative departments are either too busy to think far outside their established duties or are unwilling to take risks in supporting what they might like to see succeed.

It is here that the influence of the top executive to which I referred is so powerful and necessary. He alone, under such conditions, can release the energies of his whole organization to complete industrially and socially the cycle of research. No research is completed, industrially, until it has been applied and has become an accepted industrial activity: nor socially until it is affecting the prosperity and well being of peoples. It is a great incentive to research workers to know that their work is contributing to the industrial and social advance of their times, and in this they are with the enlightened industrial leaders.

If that is not taking place research becomes a dilettanteism and a pedantry or a personal hobby for a few privileged philosophers. Industry does not pay for philosophers' hobbies.

The top executive can put these things right. He has the confidence of his stockholders, no one doubts his practical business judgment, no one suspects him of being a hobby chaser, at least not in business.

Departmental executives take their cue from him; it is for him to give the cue of far-sighted outlook and willingness to advance by cooperative work the uncertain potentialities. It is for him to understand not only what science may do for him and his industry but what he must do to enable research to play its part successfully.

That means, even if he is not himself a scientist, direct contact with his research leaders. He must not regard them as strange creatures in an institution, to be left to themselves until they pop up with something sensational but difficult to understand on their own ground.

The story book research worker of the long haired dreamer type is really a little outmoded now. Some of the ablest youths of this country are going into scientific and research careers, youths who twenty years ago would have become lawyers or business executives or political leaders; youths with family, cultural and travel backgrounds with both the ambition and the ability to play major roles in industry.

Let members of other branches of industry get to know them, work with them, visit their laboratories, keep in touch on all kinds of their own problems, let the research men see all the wheels of the industry moving. Let the top executive keep in personal touch with his research leader, interpreting the exec-

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practicable and the latter its probable commercial value.

At the stage of this procedure, our interest in the idea may be killed. If it still survives, it goes to the Patent and Abstract Departments so that we may appraise its patentable features and learn what, if any, interference we are likely to encounter. At the same time another of our groups of readers obtains all the light available on manufacturing and other aspects of the subject. All of this costs money. But only those of you who have had experience can realize how much more it costs when one goes ahead with an expensive research program and later learns that he is merely duplicating work done before.

I should like to give you figures that would afford a true picture of the cost of a preliminary examination of a research idea in our organization; but that is impossible. Sometimes the New Projects Committee disposes of the matter with no cash outlays and with but a few hundred dollars' expense, measured in terms of salaries of our investigators and of the members of the Committee. But a preliminary survey of any real idea is more likely to represent, in salaries, laboratory work and other expenses, something between five thousand and twenty-five thousand dollars. Is it any wonder, therefore, that we refuse to pay inventors more than nominal sums for options? Of recent years most inventors with confidence in their ideas regard the good faith and interest proven by our agreement to investigate as worth more than option money.

Only 15 Ideas Left

Having started a hundred ideas in the research race and having scratched, say, thirty-five before they reach the gate and fifty more having been killed in the committees mentioned, we have, perhaps, fifteen left. We next determine the best method of manufacture of the product aimed at by each of these projects. For this we select some top chemist in our organization and lock him up in a room after having carefully removed from that room everything else except a desk, a chair and the idea. His job is to make a fundamental study of the product and of the processes by which it may be produced. Meanwhile, cooperating with him, the Reading Division and the Patent and Abstract Departments feed him with all information available. When this chemist, thus assisted, determines the possibilities, other chemists are assigned to track down the leads. This group effort may result in the selection of a process warranting the transfer from test tube and beaker to a small pilot plant. In some instances a dozen or more processes may be tried out on a small scale. And you know, too, what a large percentage of our racing stables disappears in this stage of the proceedings.

"Customer Evaluation Stage"

What is left of the stable has now reached the stage of "customer evaluation." This painful process consists in taking to the potential customers samples of the new product and learning—sometimes apparently for the first time—what are the properties missing and without which the final arbiters will not buy. Some of these requirements are, of course, vital. The new product must meet them completely. Other qualities are desirable and, for convenience, may be represented by percentages in a scale of demands. Still others are non-essential but troublesome to handle. The Sales Division must be represented by someone sufficiently sound in technical judgment to recognize the relative importance of these requirements and keep the research work at the laboratory firmly directed to securing a satisfactory solution of what is often a highly complicated problem.

One frequently encounters in projects for new products the "ceiling" of existing price. Not infrequently this is not a firm ceiling. If into the new product can be worked new and more desirable qualities—and in the study of synthetic chemicals this is often a possibility and well worth trying—the ceiling is found to be a moveable one when these new qualities are worth paying for.

Some divisions of our laboratories and some divisions of our sales organization work together in perfect harmony and efficiency in this necessary adaptation to customers' needs. Others appear to indulge in what is sometimes referred to from the sidelines, as "passing the buck." The root of this trouble is really failure to make clear to the other the difficulties of each. The improvement of these contacts is a matter which, in our organization, calls for a special liaison officer and sometimes seems to transcend even his powers. No executive is, in my opinion, too heavily calibered for this job.

Then comes the stage when, having again surveyed the horizon to see what if any news can be found of our competitors' intentions in the field upon which we are about to enter, we plan a manufacturing operation. In this the Research Division with its pilot plant experience, the engineering division, chemical mechanical and electrical, the purchasing division, with its survey of raw material sources, the legal tax and traffic departments, the manufacturing division, the budget department, the insurance department, the safety division, the container expert, the advertising division and still others all participate.

The actual transfer of production to the new plant is often a matter of great difficulty and delicacy. After all, reasonable costs do not permit long continued operations by technicians from the laboratories but, on the other hand, false economy in these matters is frequently disastrous. I have known operations to break down completely and the plant about to be abandoned when executive intervention alone bridged the gap. And, when the product finally emerges from the factory, again executive pressure is sometimes required to produce the cooperation necessary between plant and sales engineers if the customer is to be satisfied.

What Makes Successful Research

I wish now to tell you about a few angles to which, perhaps, some of you have given but little thought. What broad principles determine the success or failure of a research program? What possibility is there of financial control? What are the signals that indicate to the company's executives that the time has arrived when particular research appropriations should be reduced or expanded? And here, let me say, a firm and enthusiastic conviction that research is necessary is not sufficient. You gentlemen may feel sure that some world-shaking, revolutionary chemical discovery is just around the corner; but, nevertheless, if your company lacks the money with which to proceed, it will commit what you may call research suicide, because it simply cannot go on. Besides, it is even conceivable that you may be mistaken! And I would suggest, therefore, to those responsible technically for research the wisdom of establishing, if you have not already done so, certain controls and safeguards which we,—and I suppose other companies with more experience and skill—have worked out. For your own guidance and perhaps justification, set up, in cooperation with the treasurer of your company, a series of weekly reports in which the Accounting Department records for the preceding week the quantity and dollar sales of each new product to the development of which your laboratories have contributed. Add supporting sales sheets showing individual customers and quantities to each. (Occasionally products, if they sell only to certain customers are not worth developing.) Each month review the cumulative total and cumulative factory net profit of each product. Include only products to which the laboratory contributions have been substantial. If you claim others, the arguments ensuing will be endless and do more harm than good. And remember, of course, that your laboratories are not entitled to all of the profits they produce. Factory profit often disappears in selling expense, administrative overhead and interest on investment. All these items should prop-

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utive outlook towards the future, comparing notes, ideas. By direct contact the executive can learn more of, and influence more, the direction in which his research men are thinking; they too will keep him alive to the technical future.

If there is executive initiative towards major new fields of research so much the better—that would be ideal—commercial initiative stimulating scientific initiative and each reacting to the other not waiting for the other. I know how much I have appreciated this in my own career.

Don't let these contacts happen through intermediaries. Research is a vital thing of the mind; not a routine operation. Mental stimulation gets very woolly if conducted second hand or third hand through well meaning interpreters.

We have the knowledge of how to conduct research; the techniques are established and are growing daily; there is a lot of internal organization needed for the more efficient conduct of research as such but that will soon be attained; the potentialities are almost unlimited; the proof of great commercial successes following enlightened exploitation of research are all around us; I need hardly mention them.

Most of these things have been achieved through the intensity of the conviction of some few men that they can be achieved. Most of the commercial development has grown up either from small beginnings, starting around the original research workers who have either succeeded in attracting enough enlightened capital or have forced their own way through the difficulties of beginning. Some of them have been developed by existing corporations but in that case usually by corporations which were themselves created on a foundation of scientific research.

Again I need not mention names. You will easily recall how many of today's most progressive modern industries still show the influence, if not the names, of the pioneer research workers or technologists who gave them birth.

Tradition of Faith

They retain a tradition of faith in technological advances based on research: they see to it that a large proportion of their recruits for leading executive positions are educated scientifically. They seem to find no difficulty moreover in conducting the financial, commercial, selling and distributing activities of their business—but they do not forget where the real foundations of their businesses lie.

It is the industries which do not have such a past tradition which need to think constructively about their relation to research.

The 19th century depended more upon the possession of natural resources which either could be used directly, or converted by rather mechanical processes into goods readily saleable in an expanding market: Coal, iron, steel, cotton, textiles, agricultural products, lumber, oil in its early history. Great organizations were based on engineering works and transport: Bridges, docks, railroads; or mining and smelting. These are typical of the industrial developments of the 19th century. That era was predominant in this country up to the world war. The technological advances of that era were essentially of an engineering nature; utilization of power, improvements in machinery. Later the more advanced design of automatic machinery; looms, spinning, lathes, mechanical robots of one kind or another; the introduction of mass production methods, the assembly line technique.

Types of Executives

Industries of this type helped to create standards of efficient organization and to confirm standards of what was efficient in business executives. We think of the legal and financial type, skilled in handling political problems, investments, accustomed to organizing mergers, trading agreements, control of natural resources, developing market frontiers in new territories and new countries. Later as the limitation of markets and increase of production placed emphasis on the art of selling, top executive positions began to fall to the sales type. The big mass production industries particularly the automobile industries, have promoted production men.

Engineering Inventions

In so far as these industries depended on technology, it was upon the engineering arts which, though difficult to excel in, are comparatively easy to understand. Engineering inventions either work or do not work in a rather definite way; any intelligent executive could by inspecting them form a pretty good idea of the influence they should have on his operations. Often the advance came from outside inventors who were able to demonstrate their inventions in a direct manner. Under these conditions it was comparatively rare for the industry to run organized research departments of its own; its paid technologists were usually routine men necessary to keep the machine working. There was no long term research of the kind that we have been considering tonight whose proper conduct determines the whole future of the new modern industries.

What was good enough for a top executive only a few years ago is therefore not likely to be good enough for the conditions of the future. Science and research have ceased to be merely incidental operating controls but have become an essential pillar of industry. We may regard the three essential pillars as, capital, science and labor. The understanding and harmonious welding of these three into a smoothly running organization is the supreme task of the executive. Law, finance, operations, accounting, important as they are, are compared with these three routine mechanisms for guarding our property and keeping it working and recording the results of its working.

Health of Industry

We may learn something from the investment counselor, who with responsibility for the investment for funds, has the task of appraising the health of industrial organizations.

What does he look at? The annual balance sheets, of course; and dissects them, item by item, trading returns, costs of production, sales profits, taxes, assets, tangible and intangible, etc. But these are only records of the past. They do not show the asset of intellectual property, which is the guarantee for future health, and it is to this item that the shrewd man directs a special probe. He wants to know what amounts are spent on research, what is the quality of the men in the research laboratories, what is the attitude of the management towards them, and what are the past achievements.

He recognizes that it is in the intellectual caliber of the research men that the potential of modern industry lies; but he recognizes also that potential can never be reached without equal vision and courage in the executive departments.

Research Asks Executives

Let me conclude by summarizing what research seeks in the executive:—A mutual unity of aims cultivated through personal contact; power of critical analysis supported, but not dominated by position or past history; courage in commercial affairs equal to the courage expected in technical affairs; enthusiasm to inspire greater effort when the objective is good but the going hard; a patent anxiety to see opportunities in difficulties rather than difficulties in opportunities; that attribute of all great executives of making any man feel bigger and capable of more through having talked with him.

An Unbeatable Combination

I said I would summarize what the research man seeks in the executive; I am not sure that I have not equally summarized what the executive should seek in the research man. At any rate, there you have a combination fit to tackle the world—to assure prosperity in peace and security in war.

Continued from page 306

erly be charged against this profit; but cannot be distributed without unreasonable accounting cost. Don't worry too much about getting every little credit due you. If you are doing good work and developing worth-while ideas with fair speed, you will begin to make a showing that will serve you in good stead when, in times of business depression—and such times will continue to recur in America even with an all-wise administration in command in Washington—provided you have the facts in some such simple form as these reports will provide. On the other hand, if the Accounting Department has made up such statements week by week over a substantial period of time and if these statements prove that you have made no money, you have fair warning of the appearance which your department will present when depression comes and expenses must be cut somewhere. Thus forewarned you yourselves may in advance revise your programs in the clearer light that these figures shed on your activities.

And let me particularly recommend another form of statement. In this will be presented the total cumulative expense incurred by each research group which has as yet failed to produce a product on which the company has begun to cash in. You may dread the sight of these cumulative totals. You will be shrewder, I think, to know what they are and to have the management know what they are as you go along. Otherwise some research division may face a serious situation when the management thinks that it has "discovered" an expenditure of tens or hundreds of thousands of dollars without a single tangible dollar of result. It is much better that the management,—perhaps you too,—be "educated" as you go along.

Chemical Gold Mines

I think it true that no longer do sensible executives expect to find great chemical gold mines ready for immediate use and profit, lying around loose and waiting for anyone to pick them up. Modern chemistry has now become so complex that worthwhile objectives can rarely be achieved without broad comprehensive approaches involving years of planning and experiments. If the company that employs you aims at the big prizes, but is unwilling to sustain the cost of such fundamental research, its efforts are probably wasted. It is likely to dry up and blow away and you with it! If you think this true of your company, then—before the depression comes—you had, perhaps, best transfer to another.

A last thought as to research bookkeeping. Don't regard investment in research as a "Deferred Asset." No matter how promising your progress, you may be mistaken. And even if you have solved the problem that you set for yourself, your competitor may have found a better solution. Write off all research every month, —every dollar of it. Indeed, you had better be your own most aggressive competitor, particularly in fields which seem so different that the possibility of overlap is hardly rceognizable.

The Part of the Inventor

Now I interject a peculiarly silly point —one that I never personally encountered. I am, of course, acquainted with some of the best research men in America. They know just as much about sound business principles as I do. They know that you cannot take the profits of successful research projects without paying for the unsuccessful projects. And yet I am asked to believe that there are research men who feel themselves entitled to receive the entire net profit from their inventions. I am not going to beg the question. but I should be distressed if I thought my worthwhile research man should be taken in by this piece of political claptrap. Indeed I am astonished at the extent to which politicians endeavor to buy the inventor vote—it must be a very large one—by appealing to the "downtrodden" inventor who has, so they proclaim, been robbed of the fruits of his brain by his unscrupulous employer, the great corporation! Can it be that the design is to stir up hatred against corporations? To throw light on this problem, let us go over and see the finish of our horse race. In the Cyanamid Company we are more than delighted if two of the hundred ideas that we start in the race eventually yield any substantial profit. If one in two hundred were to put us in a great basic industry with large profits over a long period of years, we would now be the greatest company on earth. They don't! We are not! Or at least we are too modest to admit it! And so the inventor who brings us a worthwhile invention must realize that, unless it were for our resources, organization, laboratories and other facilities, to all of which his invention, if successful, must contribute, we could not give him the help that he in turn must have. Furthermore, his invention, even though a "world beater," must help pay for the research and development which other inventions, failures though they have proved, have cost us. If my recital of the procedure to which we subject new ideas, both our own and those brought to us by outside inventors, has not already made clear that the development of a new idea is an organized effort, let me add that in our chemical laboratories too the practical idea is, broadly speaking, a group effort. Not only is there the chemist working on the basic idea, but he has at his call the Machine Shop, the Physics Division, the Testing Division, the Patent Division, the Abstract Division, the group conferences and all the multitude of other activities that serve the three hundred graduate chemists that we employ.

The Place of the Executive

This, however, is but a fraction of the picture. Remember those other general committees that I mentioned? And may I even venture to suggest that those of us who spur you on and raise the money which you occasionally lose are also a part of the picture?

Last, but by no means least, may I say that one of the most difficult problems of all is to determine whether a continuation of a certain research activity is the noble perseverance and indomitable courage of a Goodyear seeking the vulcanization of rubber or a Bernard Palissy breaking up the last chair and feeding it to the furnace which is to turn out the perfect china or whether it is merely a blind pigheadedness that may, if not stopped, wreck the company. I wish I knew the answer. But this I do know: In research there is nothing more important than to be able to recognize "a dead horse," take him out of the laboratory and bury him quickly, quietly, with the least possible expense.

"Emily Post" to Research

During these remarks in which I am enjoying myself by posing as "Emily Post" to the chemical research workers of America,—an opportunity I may never have again—may I mention another matter,—curiously enough, the exact converse of much that I have just said: a disposition on the part of some of you scientists never to "let go" of a perfectly good development. Sometimes we executives would wish that, when you have have a product ready to commercialize, you would let us make some money out of it, if only to help pay your salaries while you continue to still further perfect it. Perfection in that product, if later realized, will in no way disturb us. On the contrary, it may later give us a new lead over competitors who have meanwhile caught up with us in that particular field.

I have now given you—in a shockingly sketchy way, I fear—some of my ideas of executive activities in a chemical organization. I should add, perhaps, that, amongst the supervising committees which I have mentioned, frequently executives serve on several committees. These gentlemen are some of those members of what we will call our "General Staff,"—available also for special assignments to the non-recurring problems that are always arising. In other words, there is not as much over-

head as the list of committees might suggest. Nevertheless, in these troublesome times the multiplicity of difficulties which business faces tends constantly toward more overhead.

Miscellaneous Responsibilities

Spread more or less equally amongst this executive staff is the responsibility of seeing that our specialists and all others perform the duties for which their background and talents best fit them and that their efforts are properly coordinated. Do we lack proper lines of organization? Or do we err on the other side? Do we fail to recognize that special ability, or the lack of it, at strategic points in the organization blueprint requires flexibility with constant modification of flow lines? What about the adequacy of sales coverage? Do our divisions sell the old established, easily marketed lines alone or are they exercising proper skill and perseverance in building up new products? Without these we shall, in the long run, be unable to maintain the proper average profit margin? Do our plants attempt maintenance and engineering better serviced by specialists in our organization? Is our purchasing economical and farsighted? Does any unit need cutting down, expansion or reorganization? The small percentage of research successes likely imposes a special duty on the general staff. Each division head is probably reluctant to run the risk of failures in the few research projects which his department should undertake because these failures will be charged against his operations. The general executives, familiar with some hundreds of research projects under way for all departments and reasonably confident that some of them will succeed and more than carry the rest, should insist on as comprehensive a program as the Company's situation and a careful selection of projects may warrant. A thousand questions, equally searching, and a thousand other problems leap to the executive mind.

Quality, Safety, Efficiency

The maintenance of quality, safety, efficiency and all other matters is not only essential to success as ordinarily defined but, in our business, to the preservation of life itself, both in our people and those whom we serve. Having selected, as best we can, the executives and their immediate assistants, we now impose on this group—the chief executive among them,—the legal responsibility for the whole company. They must command the moral confidence to integrate all units so they may function efficiently and return the maximum of productivity. Perhaps you may think that the existence of a large group of executives, supported by many experts, each an authority in his field, tends to complicate problems and make decisions difficult. Quite the contrary! When those to whom a particular investigation belongs have discussed the situation from all angles, one need only listen,—with as much of an appearance of wisdom as he can assume,—to their conclusions. The answer is usually obvious. One confirms the only decision possible. True, there still remain a few special problems—mostly problems into which economic and war factors enter,—which seem to defy any confident judgment.

No Communistic Set-Up

You will recognize that all this is not a communistic set-up. Even Russia has abandoned the attempt to administer corporate affairs by the workers themselves. There can no more be division of responsibility in chemical manufacture than aboard ship. Divided responsibility in the chemical industry would mean at best inefficiency, waste, higher costs, stoppage of progress and paralysis in general. At its worst, it would result in disorder, explosions, the poisoning of both workers and consumers and chaos. It is not to be thought of.

In this outline that I have given of some of the chief sectors of a chemical company's organization, one of the prime problems is, of course, the selection of executives and of their associates and chief assistants.

Where Executive and Technologist Differ

Fundamentally, so I suppose, the difference between the work of the technologist and that of the executive is that the former deals with phenomena capable of direct and relatively precise measure. The executive, using this information as a background, must project more into the unknown, include other factors more or less tangible, take a cross section far more absolute and, upon this, formulate a decision. No one wishes more than the executive that all factors could be reduced to feet or pounds or dollars, the problem put on the calculating machine and the answer turned out.

How do we recruit our executives? I have indicated to you how executive activities are aided and, in some divisions, entirely supported, even dominated by technologists. There is, of course, no sharp line of demarcation between the two kinds of men,—the technical man and the man who comes in by some other route. Both are human beings,—Washington to the contrary notwithstanding! The technologist enjoys a certain advantage in a field so scientific as the chemical industry. He may indeed as an executive successfully utilize his special knowledge in quick determination of the wisdom of embarking on certain chemical projects. On the other hand, he must be able to recognize that, with several hundred chemists in his organization, he has at his disposal the knowledge of specialists in many fields which no one human mind can hope completely to cover. Once he ventures outside his chosen field or away from subjects on which he is strictly down to date, his decisions, like those of executives generally, should, even on technical questions, be made only after consideration of the facts gathered by and the recommendations of those to whom he should look for advice. If these facts are borne in mind the transfer of a technologist to the executive group—and some technologists refuse transfer because they prefer to continue to deal with precise measures alone—may easily prove successful. But it is vital that the technologist in an executive position possess that peculiar ability to appraise factors, some of which are not precise but which are necessary to the equation. Possession of this faculty can, so far as I know, be determined only by trial and error. Meanwhile, it is obvious that a possessor of these necessary qualifications may be found in all ranks,—that is, indeed, if he is to be found in any!

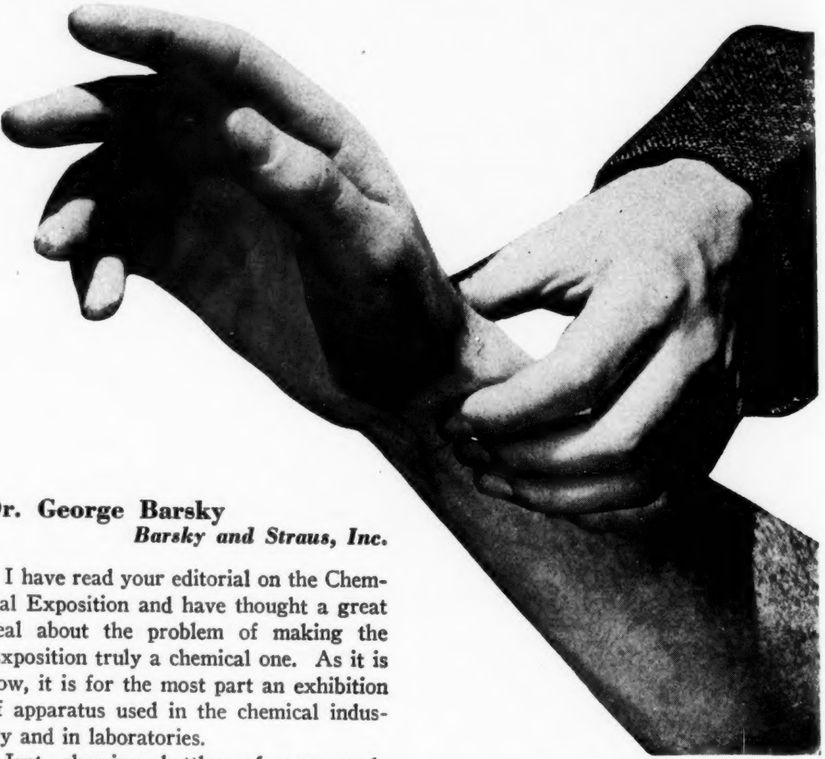
The Realm of Precision

Let me say that there is no group of men in our business more interesting and more delightful to work with than the chemists who conduct our research and our technologists who guide us at every turn. With them one enters the realm of precision,—in alluring contrast to that of the executive. The technologists are men of ideas and those ideas are of profound interest, not only from the company's point of view, but because they are the ideas that in the years to come will lower costs, really distribute wealth and actually achieve the more abundant life for all. Frequently these are the ideas that will relieve suffering and prolong life. They are the ideas that will advance humanity. We executives can back you and we will. Upon your vision, ability and sound judgment the success of vast chemical, enterprises must ultimately depend, and more than that,—world progress.

Now turn back to page 297 and read the point of view of the "technologist" as expressed by Dr. E. C. Williams.

The Pulse of Opinion—

Why Not a Strictly Chemical Show?



C. P. Gulick
Chairman of the Board, National Oil Products Co., Inc.

It is my personal opinion that a special type of chemical exposition, which would place chemicals only on display, eliminating equipment, would ultimately be unprofitable . . . if not from the very beginning. The modern chemical manufacturer maintains market research departments, market development departments, etc., which bring him in contact with all potential markets for his product, and then through a highly developed sales technique pursues the development of those markets which appear attractive. Literature, samples and data of all kinds are easily transmittable through mail.

None of these arguments applies with equal force in respect to machinery and equipment. Chemists and chemical engineers must either visit many equipment producers, or see them all at a central point, such as an exposition.

I therefore feel that it will be an error to eliminate equipment from any chemical exposition.

Dr. Maximilan Toch
New York City

I do hope that there is going to be an exhibition which will be at least 75 per cent. strictly chemical. I do not think you want a complete chemical show because that would eliminate laboratory equipment and some new machinery or apparatus. I was very much disappointed at the last show for the principal reason that I did not learn anything when I went there. One-half of a new show could be taken up with the modern plastics. We are all exceedingly interested from every angle and I hope our next show will be more instructive.

E. T. Asplundh
Assistant to Vice-President, Columbia Chemical Division, Pittsburgh Plate Glass Co.

It is the opinion of our personnel who visited the Show that it should be continued on the present basis, showing both equipment and chemicals every two years.

Dr. George Barsky
Barsky and Straus, Inc.

I have read your editorial on the Chemical Exposition and have thought a great deal about the problem of making the Exposition truly a chemical one. As it is now, it is for the most part an exhibition of apparatus used in the chemical industry and in laboratories.

Just showing bottles of compounds would be silly as well as useless. Drug stores are full of them. Chemicals are important because of what they do, and because of their relationship to other industries. Therefore, chemical exhibits should show, either by diagrams or demonstrations, these two things.

Allen Abrams
Technical Director Marathon Paper Mills Co.

Certainly it would seem that pure and applied chemistry should receive full recognition at the Exposition of Chemical Industries. There should be a showing of important new chemical materials or of new applications of the older materials. People want to know of what a material is made, what are its properties, what are the uses and what may it offer in the way of new industry and employment. May it not be desirable to present this information in the forms easiest to grasp, such as charts, photographs and with samples?

Perhaps a segregation of the more purely chemical exhibits is desirable. Might it be possible even to have one evening reserved for those who are directly connected with chemistry and its applications, so that these persons could have a less crowded and hurried atmosphere in which to evaluate such products?

R. F. Revson
Chemist, R. F. Revson Co.

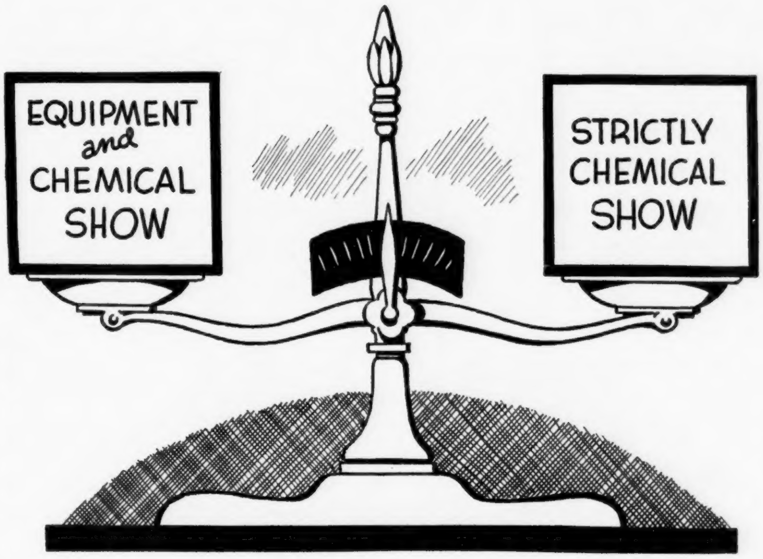
I have heard much criticism of the Chemical Exposition in that it has been given so largely over to machinery and equipment. One hears the same comment "Oh, yes, the show is allright and you might get something out of it if you are interested in machinery, but there is no chemical exhibit of any consequence." It should be realized that after all the chemical industry is one of chemicals. It is unquestionably true that mass production of chemicals depends on machinery but the amount of money spent in chemicals yearly must be several times that spent for equipment.

Many of us who go to the shows have a minor interest in machinery. Those who purchase chemicals for resale purposes have practically no commercial interest in machines. There must be hundreds of chemists who are looking for chemicals of different purities and properties which they hope to process in plants already existing. Then, too, many industries that are classified as chemical are not essentially mass producers. Slight differences in efficiency of machines are not worth the additional costs. Moreover, due to the nature of their processes equipment does not become worn out or obsolete so rapidly.

Doubtless, the Exposition attracts some visitors from Canada and Latin America. They may need chemicals rather than equipment. But regardless of their needs, certainly if they come for such a show they want the works. They have sacrificed time and money for the trip.

Personally, I feel that a floor devoted to chemicals at the regular Exposition period is the best answer. First it will save time for the visitor and secondly, he can better visualize his needs.

A certain chemical may require a definite type of machine, an alloy capable of withstanding the process. A kind of package in which to market the product, etc. This means the visitor may coordinate his needs, at a time that is propitious. It also means that those who seek only chemicals need not hopelessly wander amidst an ocean of autoclaves and presses to find three chemical exhibitors, but can go direct to the chemical section. I feel that your action in this matter is timely and I trust something will be done to improve conditions.



The opinions expressed this month again seem to indicate preference for a continuance of the present set-up of chemicals and equipment providing that a special section or floor be set aside for chemical manufacturers.

Sidney Thayer, Jr.

Secretary-Treasurer, Henry Bower Chemical Mfg. Co.

We definitely oppose any attempt to have a separate chemical show where there would be nothing but exhibits of chemicals. We believe that if there is sufficient demand for it, it would be an excellent idea to have a separate section or even an entire floor devoted to exhibits of chemicals and chemistry. We realize, however, that there are a great many chemical companies who really have nothing to exhibit of any practical interest. We are one of them, as we do not think anybody would thrill to looking at a cylinder of anhydrous ammonia or a barrel of dry chemicals and, since the end products of our chemicals would no doubt be exhibited by their own makers, we are limited to our own exhibits.

Percy C. Kingsbury

Chief Engineer, General Ceramics Co.

A "National Exposition of Chemical Industries" without du Pont, Carbide & Carbon, General Chemical, Monsanto, Commercial Solvents, American Cyanamid, Eastman Kodak, American Potash, Solvay, Penn. Salt, National Aniline, General Aniline, Hooker and Mathieson, to mention just a few that occur to me at the moment, is quite obviously an absurdity.

Many of these concerns exhibited at the earlier shows and dropped out later on, doubtless because they derived no benefit from it. I was a member of the Advisory Committee at the time these defections were taking place, and I am satisfied that the lack of interest in the chemical, as distinguished from the chemical equipment, exhibits was due solely to the nature of these exhibits. In many cases, the chemical exhibits consisted merely of a few shelves of bottles filled with some innocuous material and labeled butyl alcohol, sulfuric acid, caustic soda, and so on, with little or no information regarding these products. Naturally such exhibits attracted no interest.

As an equipment show exclusively the present type of exposition is apparently a fixture. The exhibitor has, however, nothing to offer to the general public and is interested in attracting only those visitors who are connected with the industry, or who have enough of a technical background to appreciate what it is all about. Other visitors are an expensive nuisance.

On the other hand, it seems to me that the chemical manufacturers could do a splendid job by selling to the general public the vital importance of their products to every phase of our national life. There is ample evidence that the public is hungry for authoritative information presented in a popular way that the average intelligent layman can understand. A few of the larger companies are doing a splendid job along these lines, but I believe that an even more effective and less expensive way of accomplishing this would be by a strictly chemical exposition at two year intervals dramatizing the story of chemical achievement during that period, rather than merely exhibiting small samples of raw materials or finished products. I believe that such an exposition would suggest to the non-technical business man many uses for new and old chemical products that might never occur to the sales and distribution departments of the exhibitors who would thus get some direct return for their disbursement. However, aside from any immediately tangible results, such an exposition would benefit the industry as a whole by stimulating at regular intervals the present popular interest in chemical progress.

Dean Frank C. Whitmore

The Pennsylvania State College

I heartily agree with the suggestion that more chemistry be injected into the next Exposition of Chemical Industries. Rather than having one floor devoted to more purely chemical exhibits I believe it would be more effective to have approximately one exhibit in three throughout the Exposition devoted to such chemical exhibits. If such an arrangement were planned well in advance, I am sure it would be successful. Certainly many people would be attracted to the Exposition by such a sandwiching of equipment and chemical exhibits who are not attracted by the present type of exhibits.

Walter A. Schmidt

General Manager, Western Precipitation Corp.

From your editorial, I judge that other visitors to the last Chemical Exposition sensed the absence of adequate display of new chemical products, reflecting recent progress in the Chemical Industry, the exhibits being essentially all equipment and materials useful in the Chemical In-

dustry. Of course, the reason for this is obvious, but if the enterprise is to be continued under the title "Chemical Exposition" and not under the name "Chemical Equipment Exposition," it seems to me that it would be desirable to show the visitors what the chemical industry, as a whole, has accomplished during the time intervening since the previous Exposition, provided this can be accomplished without undue financial burden upon the chemical manufacturers.

Chemical Industries and the American Chemical Society have done their best in recent years to exhibit the outstanding new products in their booths, but they can not be expected to do a complete job. I would recommend that an attempt be made to have a certain floor space, as, for example, the front half of the second or third floors, set aside at substantially reduced rentals, for proper exhibit of new chemical products, including interesting and informative applications in consumers goods. This should include dyed fabrics, moulded synthetic resins, and anything else which reflects the progress of chemistry in the general comfort and well-being of the public. Such an exhibit could be arranged in the manner of a high class store, and it should be unnecessary for each exhibitor to maintain its own personnel at the exhibit;—in other words, that the rental could include supervision for which plenty of intelligent chemists could be recruited from those who are momentarily out of a job.

I think such a concentrated exhibit would have many advantages over scattered exhibits, sprinkled helter-skelter between the booths of the chemical equipment manufacturers.

Roland P. Soule

Chemical Economist

There is no doubt that a wider display of chemical products in addition to the usual exhibition of chemical equipment would proportionately broaden the appeal of the so-called "Exposition of Chemical Industries." As you say, the show last year was a splendid one, and nobody could visit it without adding something to his store of knowledge. Nevertheless, it probably was more useful to the man with some particular operating problem on his hands than it was to the more casual visitor who was simply "prospecting" for new and stimulating ideas.

My understanding is that the exhibitors have been reluctant—and rightly so—to pitch the exhibition on a key that would attract a horde of school children, curiosity seekers, and catalog collectors. It obviously would be a bad mistake to dilute in such a fashion and otherwise to embarrass bona-fide technologists and company representatives who spell the difference between running an exhibit at a profit or a loss.

On the other hand, I am sure you are not proposing a popular science show. The appeal would still be primarily technical, but the emphasis would not be so strongly on manufacturing aspects alone. It would be broadened to include exhibits of products and processes of more particular interest to research men and buyers of chemicals. The dignified and instructive exhibition of nitro-paraffines by Commercial Solvents Corporation is probably an example of what you have in mind.

If you can interest additional chemical manufacturers to follow suit, more power to you!

Henry T. Hotchkiss, Jr.

Chemical Engineer

It is surprising the number of companies that have not learned something of showmanship from the Fair. In addition, there should be some limitation of the scope of representation, of the noise factors associated with any one exhibit and of the ratio of exhibit space to spectator accommodation. The chemical field is too broad to cover in one show. Exhibitions should conform to the title whether it be "Equipment," "Chemicals," or "Tools." A more neighborly consideration of the comfort of exhibitors and spectators should be in evidence. The latter should not have to struggle to see exhibits nor become worn out with the effort.

J. G. Park

Vice-President
Standard Alcohol Co.

We have discussed the question regarding the chemical exposition with our various people in the Development Company, and we are presenting the consensus of their opinion.

We had considered taking space in the Exposition, but have decided against it because we did not feel that the majority of the visitors to the Exposition were people we wanted to reach, and because in our opinion the Exposition has generally been considered by the public as more of a machinery exposition than otherwise.

As we developed more products, and products which are more susceptible to public advertising, we naturally become more inclined to exhibit and it is our general opinion that a decision in this direction would be hastened if there were a separate exhibition on new chemicals such as you suggest.

The Bookshelf

Rubber Red Book, 1939; Rubber Age, 420 pp., $5.00. The well-known handbook of the rubber industry—an almanac, directory, buying guide, et al., all within one cover.

Work-Hour Value, by Max G. Winkel; Meador Publishing Co., Boston, 268 pp., $2.00. Presents the idea that it is the work-hour which is the true basis of value, and appraises supply and demand in the light of this novel thesis.

Explosives, Matches & Fireworks, by Joseph Reilly, Van Nostrand, N. Y., 172 pp., $3.00. A separate publication of that portion of "Technical Methods of Chemical Analysis" (Vol. IV) issued for the convenience of this specialized field.

Some Methods for the Detection and Estimation of Poisonous Gases in the Air, by A. S. Zhitkova, Service to Industry, Hartford, Conn., 198 pp., $3.00. Translation of a Russian book that has won a deserved reputation for its practical usefulness to the industrial hygienist.

Practical Manual of Chemical Engineering, by Harold Tongue, Van Nostrand, N. Y., 560 pp., $12.00. A new work by a recognized English authority—with an approach novel to American texts and distinguished for its clear and complete handling particularly of the materials of engineering—a significant and valuable work.

Semimicro Qualitative Analysis, by A. R. Middleton and J. W. Willard, Prentice-Hall, N. Y., 446 pp., $3.50. A pioneer working book on the practical practice of analysis of small quantities of material—exceedingly well done job.

Le Mirage de l'Iode, by L. M. Bernard, Soc. d'Editions, 7 Rue Jacob, Paris, 161 pp., paper covers, 35 francs. A commercial study of the iodine industry with special reference to the kelp processes.

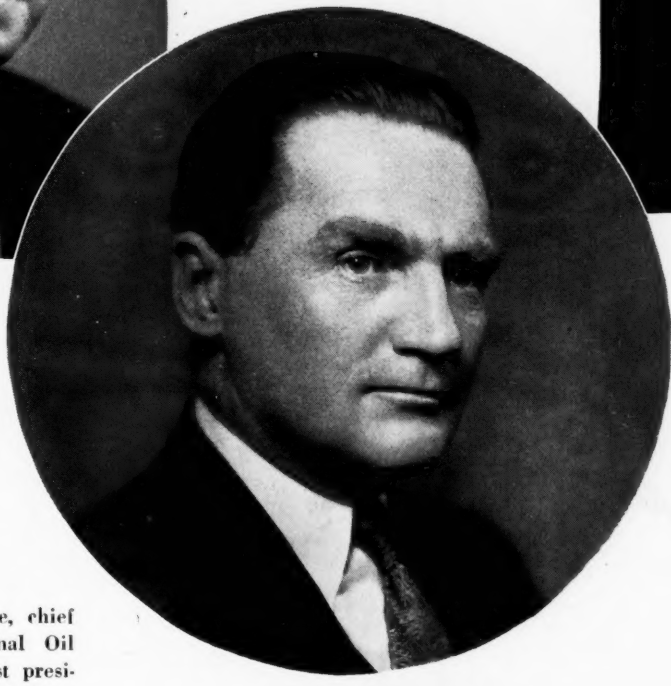
Introduction to Practical Organic Chemistry, by F. G. Mann and B. C. Saunders, Longmans-Green, N. Y., 191 pp., $1.50. A British school text by the same authors responsible for a more advanced organic book which is most widely used here and abroad.

Examination of Fragmental Rocks, by Frederick G. Tickell, Stamford Univ. Press, Calif., 154 pp., $4.00. A revised edition of the manual on the examination of various sands for the determination of particle size, distribution, porosity and other physical properties, with section on their mineral identification.

Superheater in Modern Power Plant, by D. W. Rudorff, Pitman, N. Y., 293 pp., $6.00. From an exposition of fundamental computations to a description of latest apparatus for control. The superheater is exhaustively treated in the light of latest technology and applied practice in this rivalless book.

"Headliners" In the News

Right—Joseph J. Tumpeer, elected president The Pioneer Asphalt Company, Chicago. Joining the company as salesman in 1920, he progressed through positions of sales manager, vice-president before recent election as president.

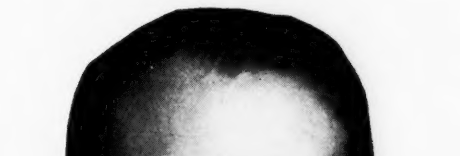


Above—Al. C. Mueller has been named Midwestern representative of the Varcum Chemical Corporation, with headquarters in Chicago.

Left—Honorable Gerald P. Nye, U. S. Senator from North Dakota will be guest speaker at 15th Annual Drug, Chemical and Allied Trades Banquet to be held at New York's Waldorf-Astoria Hotel, March 14.

Below—Dr. Donald Price, chief research chemist, National Oil Products, was named first president of Chemists' Alumni Association of Columbia.

Below—G. J. Keady was elected executive vice-president, The Sharples Corporation. Mr. Keady stepped up from the position of Sharples general sales manager.

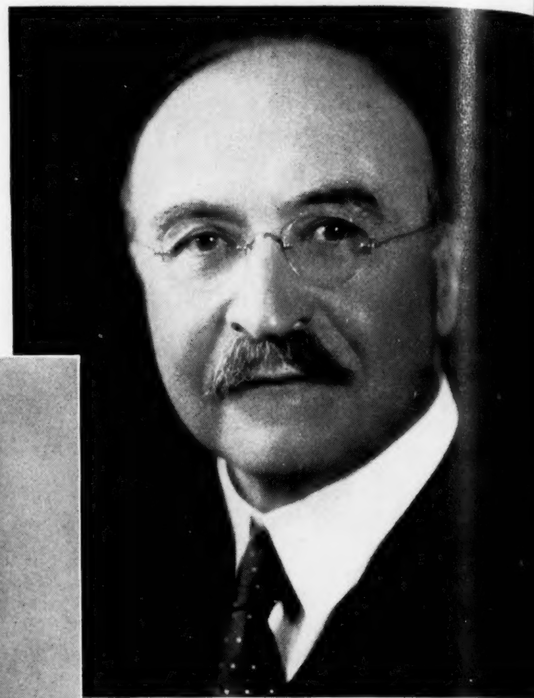


Above — Victor E. Williams, Monsanto, elected to serve on board of governors of Drug and Chemical Club at New York City meeting.

Modern Pioneers of

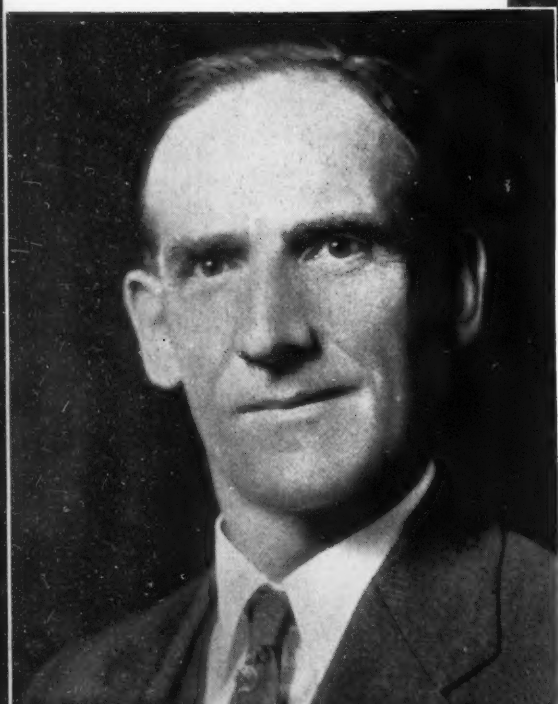
Nineteen inventors and research scientists, selected from a field of 500 honored at regional dinners, were named "Modern Pioneers" by National Association of Manufacturers for brilliant achievement in American industry. They included ten men, well known in the chemical industry, whose portraits appear on these pages.

Left—Charles Frederick Wallace, vice-president, Wallace & Tiernan Co., Inc., honored as being one of the men most responsible for chlorine treatment of drinking water and other similar developments.



Above—Dr. Leo Hendrick Baekeland, Founder, The Bakelite Corp., one of founders of plastics industry. Honored for developments of Bakelite; for his work on manufacture, use of photographic paper and on electrolytic coils.

Right—Dr. William David Coolidge, Director, Research Laboratory, General Electric, inventor of ductile tungsten and improved X-ray tube. Honored for his contributions to electrical engineering, medicine, radiology, physics and chemistry.



Left—Dr. Frederick Gardner Cottrell, Washington chemist, honored for his pioneering work in the collection dust particles from blast furnaces and in recovery of valuable products precipitated from gases.

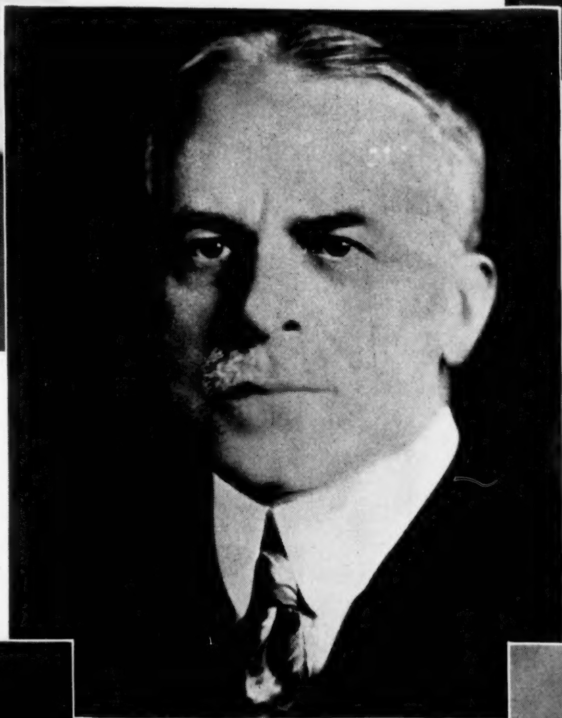
Right—Dr. Harry Steenbock, Biochemistry professor, University of Wisconsin; honored as originator of irradiation process which led to production of Vitamin D foods and drugs, irradiated ergosterol, etc.

American Industry

Also honored as "Modern Pioneers" was Du Pont's Nylon Group, including Wallace Hume Carothers (deceased), Willard E. Catling, Donald D. Coffman, Winfield W. Heckert, Benjamin W. Howk, George D. Graves, Wilbur A. Lazier, John B. Miles, Jr., Wesley R. Peterson, Frank K. Signaigo, and Edgar W. Spanagel.

Above—Dr. Irving Langmuir, associate director, research laboratory, General Electric, honored as inventor of the gas filled electric lamp, pioneer in many branches of electrical engineering, and for fundamental research in chemistry and physics.

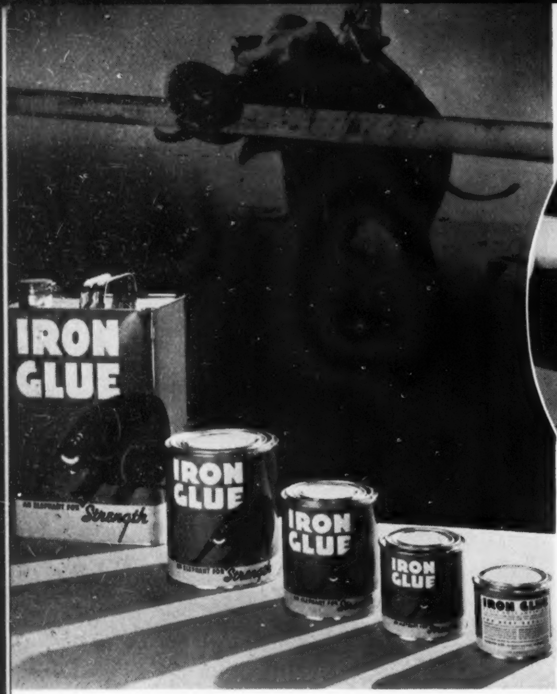
Right—John Van Nostrand Dorr, President, The Dorr Company, Inc., honored for inventions leading to recovery of gold, other metals from low grade ores, and contribution to scientific treatment of sewage.



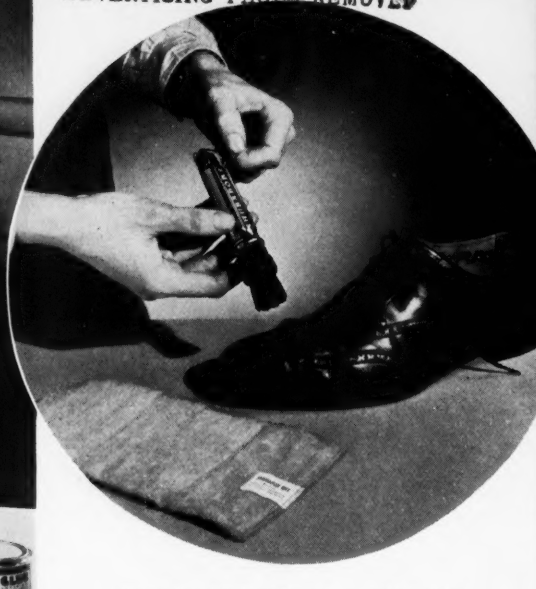
Left—Dr. William Meriam Burton, former president, Standard Oil of Indiana; honored as pioneer in petroleum cracking greatly increasing yield of gasoline from nation's limited supply of petroleum.

Left—Edwin Herbert Land, President, Polaroid Corp., honored for his work on polarized light which made possible anti-glare glasses, lamps, windows; aided three-dimensional motion pictures.

Right—Dr. George Oliver Curme, Jr., Vice-President, Carbide and Carbon Chemicals Corp., honored for discoveries in connection with hydro-carbon compounds resulting in many new industrial products, processes.



Striking dramatization of product's slogan "An Elephant for Strength" on package label, won first prize for Iron Glue in Metal Container Group. Maker: American Can.



Shubador "Streamliner," a collapsible tube of shoe cream with brush on head took a major award in Collapsible Tubes Group. Maker: Peerless Tube.

Defender 777 Panthermic Developer container holding two different powdered developers in separate compartments got award in Fiber Can Group. Maker: Stone Paper Tube.

★

ALL AMERICA PACKAGE COMPETITION

★

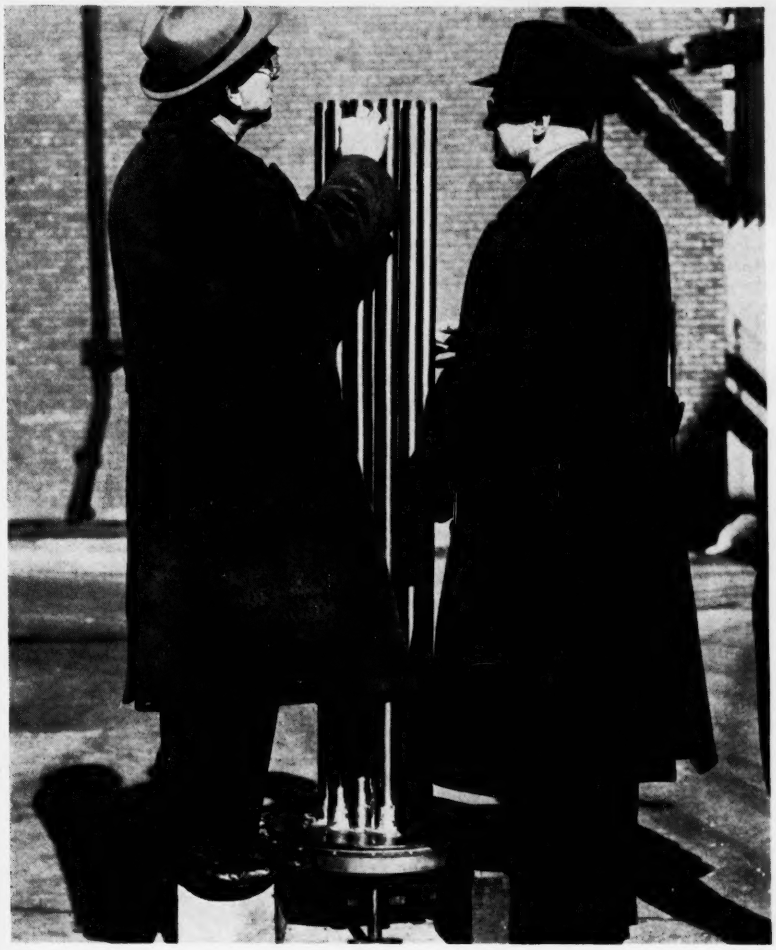
Rubber Paper Cement can which serves directly as dispenser won honorable mention in Metal Containers Group. Maker: Cordiano Can.

Prize winner in Metal Containers was 5 gallon oil can; when empty it can be re-used for oil, kerosene or water. Maker: Owens-Illinois Can.

Cotton fertilizer bag lined with Paratex to make it moisture proof received Honorable Mention in Opaque Wraps, Bags, Envelopes Group. Maker: Chase Bag.

Large metal and wire floor display for Sheaffer's "Skrip" and adhesive products won major award in Floor Displays Group. Maker: The Washburn Co.

PLANT OPERATION AND MANAGEMENT



Tantalum Multiple Bayonet Heater

A. J. Anselm (left) and F. L. Hunter, general superintendent and chief engineer, tantalum division, Fansteel Metallurgical Corp., inspect a tantalum multiple bayonet which evaporates 5 tons of muriatic acid hourly. It consists of 19 tantalum bayonets, each 4′–10″ long, supplied from a common steam chest which fits into the bottom nozzle of an evaporating vessel.

A DIGEST OF NEW METHODS AND EQUIPMENT FOR CHEMICAL MAKERS

Refilling SMALL CYLINDERS

By George W. Grove

(Mr. Grove is senior mining engineer, Safety Division, Bureau of Mines, Pittsburgh, Pa.)

SMALL cylinders such as those used for supplying oxygen on self-contained oxygen breathing-apparatus, oxygen inhalers, and other types of equipment require frequent refilling. Although a comparatively simple procedure, the refilling of such cylinders has certain features concerning the methods used and the precautions to be taken that should receive consideration.

Definite information is not available regarding the first use of small cylinders for storing oxygen; however, it is known that they were available as long ago as 1853, when the first self-contained oxygen breathing-apparatus was constructed in Belgium.

Since its organization in 1910 the Bureau of Mines has used an average of about 500 small oxygen cylinders on its oxygen breathing-apparatus and oxygen inhalers. In addition to this, thousands of other cylinders are being used on self-contained oxygen breathing-apparatus and other equipment by mining companies, the United States Navy, State and municipal departments, and other organizations. These cylinders doubtless have been refilled thousands and probably hundreds of thousands of times. No employee of the Bureau of Mines has been injured and, as far as the Bureau is aware, no injuries have been received by other persons during refilling operations. This proves rather conclusively that, if ordinary precautions are taken, small oxygen cylinders can be refilled safely.

Regardless of size, all oxygen cylinders should be constructed and tested in accordance with the requirements and regulations[1] of the Interstate Commerce Commission and should be maintained in good condition. These regulations require that cylinders be made of high-grade carbon steel, that they satisfactorily pass prescribed tests before they are used, and that they be equipped with a suitable safety cap. The safety cap is filled with Rose's metal (an alloy of 50 parts bismuth, 22 parts tin, and 28 parts lead by weight, which melts at 94° C.) and a frangible copper disk that when subjected to excessive pressure, owing to overcharging or expansion of the oxygen by heat, will break or melt and allow the oxygen to escape without rupturing the cylinder.

Small cylinders should be free of leaks and equipped with an efficient, easily operated closing valve. A small copper tube should be attached to the body of the closing valve and extend several inches into the cylinder to prevent sediment, scale, and moisture from being drawn from the cylinder with the oxygen in use.

[1] Interstate Commerce Commission (and Bureau of Explosives of American Railway Association), Regulations for the Transportation of Explosives and Other Dangerous Articles b Freight and Express and Specifications for Shipping Containers; Specification 3-A, 1930, p. 261.

Although the I. C. C. regulations do not require a quinquennial (5-year) test for gas cylinders that are not shipped in interstate commerce, all cylinders should be retested every 5 years for the protection of persons who refill, handle, and use them.

The Bureau of Mines uses four sizes of small oxygen cylinders. When charged to 135 atmospheres (1,984.5 pounds) per square inch these have a capacity of about 3, 5.75, 8.6, and 15 cubic feet of oxygen, and are used on the ½-hour, 1-hour, and 2-hour oxygen breathing-apparatus and oxygen inhalers, respectively, the 8.6-cu. ft. size being the most widely used. They are examined carefully and retested every 5 years and, so far as possible, maintained in good condition at all times.

Methods of Refilling Cylinders

Small oxygen cylinders can be refilled by two methods, as follows:

1. A small cylinder is attached to a large (100-or 200-cu. ft.) cylinder by a suitable connection, the valves of both cylinders are opened, and the pressure is allowed to equalize between the two cylinders. This method is not desirable or recommended except in an emergency, as the small cylinder can rarely be fully charged in this manner. The large cylinders usually are charged by the oxygen manufacturer to about 110-115 atmospheres, and the pressure of a fully charged small cylinder generally is about 135 or more atmospheres. Therefore, it is obvious that the small cylinder cannot be fully charged by equalizing pressure. Moreover, the more small cylinders that are filled from a large cylinder by equalizing pressure, the more the pressure will drop in the large cylinder and the lower the pressure will be in the small cylinder.
2. A high-pressure oxygen pump will draw oxygen from a large cylinder having a low, medium, or high pressure and will compress or build up the desired pressure in the small cylinder. The use of such a pump is essential for efficient and economical refilling. Two types of oxygen pumps are in use in the United States; these are the Draeger (German) type and the Fleuss (English) type. Such pumps are either hand-operated or power-driven and will render satisfactory service if used and maintained properly.

Some desirable features of the Draeger-type pump are its light weight, the accessibility of the valves, and compactness, while outstanding features of the Fleuss-type pump are its ruggedness and the fact that a liquid packing gives longer and more efficient service without repacking. Both pumps are provided with by-pass valves and tubes that allow equalizing of pressure between the large storage cylinder and the small cylinder being refilled without passing the oxygen through the pump.

This article is published by permission of the Director, Bureau of Mines, Department of Interior. Presented at a meeting of the Compressed Gas Manufacturers' Association, New York, N. Y., January 23, 1940.

There are several ways of charging or refilling small oxygen cylinders by use of a pump, the object with each being to refill the cylinders with the least labor (if hand-operated), wear on the pump, and loss of oxygen. The following method gives satisfactory results:

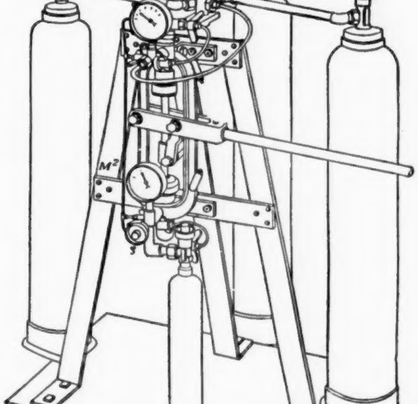
Connect three large 100- or 200-cubic foot cylinders to the pump by means of flexible copper tubing and suitable connections. Then attach the small cylinder to the pump outlet and charge one or more small cylinders by bypassing the oxygen around the pump until the pressure in the small cylinder is equal to the pressure in the first large cylinder. Then operate the pump sufficiently to fully charge the small cylinder. Repeat this procedure until pressure in the first large cylinder drops about one-third, then use the second large cylinder for the last stage of charging the small cylinder until the pressure is reduced about two-thirds in the first large cylinder and about one-third in the second. Next equalize pressure and pump in stages from the first and second large cylinders and use the third large cylinder for the final stage of refilling the small cylinder. This procedure eventually will result in the three large cylinders having different pressures—low, medium, and high.

By using three large cylinders with different pressures and always pumping from the low cylinder until the pressure in the small cylinder is about twice that of the large, the low cylinder will be empty or almost empty when the high cylinder is reduced to the point where it becomes difficult to charge the small cylinder completely. When the pressure in the low cylinder is reduced to about 10 or 15 atmospheres, it should be replaced with a fully charged cylinder and the second cylinder used as the low cylinder. This method allows the large cylinder to be emptied and still provide enough pressure in the high cylinder to charge the small cylinders fully without undue strain on the pump.

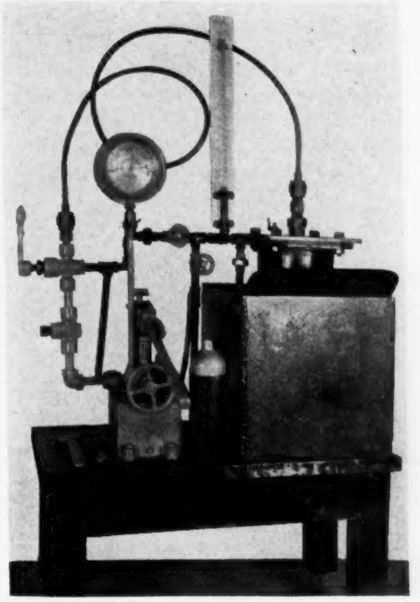
The details of charging a small cylinder by using three large cylinders with different pressures (low, medium, and high) and a pump are as follows:

Connect the small cylinder to the oxygen pump, with the pump handle in the "up" position. (This is necessary as the handle, if left down, will be thrown forcibly upward by the pressure in the large cylinder.) Open in succession the valve of the small cylinder, the outlet valve of the pump, the bypass valve of the pump, and the valve of the low-pressure large cylinder. When the pressure is equalized between the large and small cylinders, close the bypass valve, read the pressure gage, and pump from the low-pressure large cylinder until the pressure in the small cylinder is about double that of the low-pressure large cylinder. Then close the valve of the low-pressure large cylinder. Next open the bypass valve and the medium-pressure large cylinder, again equalize the pressure between the large and small cylinders, close the bypass valve, read the gage, and operate the pump until the pressure is again doubled. Then close the valve of the medium-pressure large cylinder. Following this open the bypass valve and the valve on the high-pressure large cylinder and again equalize the pressure. Then close the bypass valve, read the pump gage, and operate the pump until the desired pressure is reached on the gage and in the small cylinder. Owing to friction and pressure, the small cylinder will become warm and the gage should show about 10 or 15 atmospheres higher than the normal fully charged pressure to provide for a drop in pressure when the bottle cools. Then close the valves on the high-pressure large cylinder, on the outlet of the pump, and on the small cylinder. Finally, detach the small cylinder from the pump. Every stroke of the pump handle must be carried steadily to the full limit of its travel to obtain full efficiency of each stroke in compressing the oxygen in the small cylinder.

Care must be exercised also that the pressure in the large cylinders is not equalized as a result of having more than one valve open at a time and that the bypass valve on the pump is always opened before the pressure between a large cylinder and the small cylinder is equalized. Pressure should be equalized through the bypass instead of through the pump, which would be a strain on the pump and with a liquid-packed pump force or carry some of the liquid into the small cylinder.



Draeger pump



Apparatus used for testing small cylinders includes steel water jacket, glass burette (graduated in cubic centimeters), gauge, hand operated pump, suitable valves, and necessary tubing. (U. S. Bureau of Mines photo.)

Immediately after a small cylinder has been refilled, the valve closed, and the cylinder detached from the pump, the cylinder valve should have a threaded blank disk or cap screwed tightly on the outlet of the valve. The valve then should be opened and immersed in water. Air bubbles around the valve stem indicate that the valve will leak when it is opened and in use. If leaks do not appear during this test, the valve should be closed, the metal cap removed, and the valve again immersed in water. Leakage with this test indicates that the valve is not tightly closed or leaks when closed, either of which will result in a drop in pressure and a loss of oxygen from the small cylinder. All leaks should be stopped before the cylinder is used.

Reference has been made to periodic testing of oxygen cylinders. However, before the procedure is described it might be well to discuss briefly the necessity for such tests. When drawn from the large cylinders undoubtedly the oxygen contains some moisture, which is carried into the small cylinder during refilling operations. This moisture, together with oxidation of the steel of the cylinder, forms scale, sediment, and rust in the cylinder, causing "pitting," and weakens the walls of the cylinder. Moreover, the change in temperature owing to friction and pressure during refilling and the high pressure contained in the cylinder probably also contribute to eventual weakening of the cylinder. As these changes occur with no visible effect on the outside and even visual examination of the inside of the cylinder often fails to discover defects, hydrostatic pressure is the only means by which the condition of cylinders can be determined.

The Interstate Commerce Commission does not require periodic testing of oxygen cylinders that are not shipped in interstate commerce; however, all small cylinders should be retested every 5 years, as specified by the Commission, even if they are not shipped in interstate commerce, to assure their fitness for use. These tests determine the "elastic expansion" (total expansion minus permanent expansion) when the cylinder is subjected to 4,000 pounds per square inch hydrostatic pressure. The apparatus used for making such tests (see p. 323) includes a steel water jacket, a glass burette (graduated in cubic centimeters), a gage, a hand operated pump, suitable valves, and necessary tubing.

Before testing, remove the valve from the small cylinder to be tested. Then loosen rust and scale from the inside of the cylinder by hitting the cylinder several times with a wooden mallet. Next clean the cylinder and examine the inside walls for "pitting" and defects with an electric lamp small enough to be introduced into the cylinder.

Briefly a cylinder may be tested as follows: The cylinder, with valve removed, is filled with water and screwed tightly into the connection of the tube leading to the pump. The cylinder is then placed in the water jacket and the top of the water jacket securely bolted into position. The water jacket is then filled with water until the water level is visible in the burette. Then the pump is operated until the pressure is built up and the pressure gage shows 4,000 pounds per square inch inside the small cylinder. This pressure is held for 30 seconds. The small cylinder being tested will expand owing to the pressure, the amount of expansion being indicated by the height of the water level in the burette. After the burette is read the pressure is released. If the small cylinder shows a greater permanent expansion than one tenth of the total expansion, it is considered unfit for further use. On the other hand, if the cylinder passes the test satisfactorily it should be stamped with the date of testing.

It will be noted that small cylinders that usually are charged from about 135 to 150 atmospheres (1,984.5 to 2,205 pounds) per square inch are tested at 4,000 pounds per square inch. Therefore, cylinders that pass the prescribed tests satisfactorily have a fairly high safety factor, which of course is highly desirable.

Precautionary Measures

Several precautions relating to the purchase, use, and re-filling of small oxygen cylinders should be observed, as follows:

1. Only cylinders that have satisfactorily passed the requirements and specification No. 3-A of the Interstate Commerce Commission should be purchased.
2. Cylinders should be handled with reasonable care during transportation, use, and refilling.
3. Particular care should be exercised to prevent charged cylinders from forcibly striking one another, being dropped, or falling and striking a hard floor or object.
4. Cylinders should be retested every 5 years in accordance with required specifications.
5. A suitable pump (preferably power-operated) should be used for refilling cylinders.
6. Pump, tubing, and connections should be maintained in good condition.
7. Three large storage cylinders should be used for rapid and efficient refilling.
8. To empty cylinders and to provide fairly high pressure for final stage of refilling the small cylinder, equalization pressure between large cylinders should be avoided.
9. Small cylinders should be tested for leaks when closing valve is open and shut immediately after refilling.
10. Oil or grease should not be used on an oxygen pump, cylinders, valves, or any oxygen apparatus, as an explosion is likely to result.

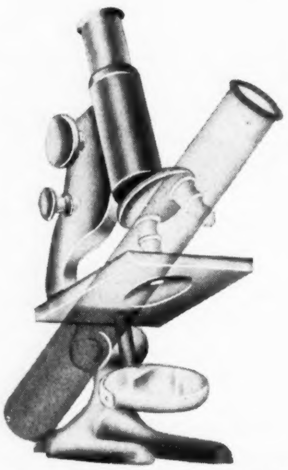
Summary

Small oxygen cylinders can be transported, used, refilled, and retested safely if ordinary care and precautions are exercised.

Proper equipment, correctly maintained and used, for refilling cylinders will insure safe and efficient results. On the other hand, carelessness, ignorance of existing hazards or of proper procedure, and the failure to exercise ordinary precautions may cause an explosion of oxygen or the shattering of a cylinder, with disastrous results.

Refilling operations have been performed safely thousands upon thousands of times, and this record can be continued if proper equipment is used and the correct procedure followed.

NEW PROCESSES



Butadiene from Vinylacetylene

Butadiene is obtained by reduction of vinylacetylene with alkali-metal amalgam and substances developing hydrogen therewith such as water and/or alcohols. Vinylacetylene may be led into the amalgam mixed with water or led together with water vapor over anhydrous amalgam or liquid amalgam may react in counter-current with a solution of vinylacetylene in an alcohol. Sodium, potassium, rubidium or mixed alkali amalgams may be used. Other metals especially thallium may be added, and electrolytes, e.g., secondary or mixtures of primary and secondary potassium phosphates, common salt, zinc or chromium salts, may be present in the reaction liquids. Carbon dioxide added to the vinylacetylene increases the speed of hydrogenation. *Chem. Trade Jour. and Chem. Eng.*, Feb. 9, 1940.

Silvering Process

One of the large glass companies has announced a new silvering process, which it will make available immediately to the mirror industry. Under present conditions, it usually requires a half hour to silver a twelve-foot square area of glass. By the new process, the time is cut to fifty-seven seconds. An important factor in this time-saving is the new method of spraying the silvering, rather than pouring it on and then allowing it to smooth out and float across the surface. Materials and labor costs are cut, and the mirror thus silvered is of far better quality, being clearer and more brilliant. *The Glass Industry*, Feb., 1940.

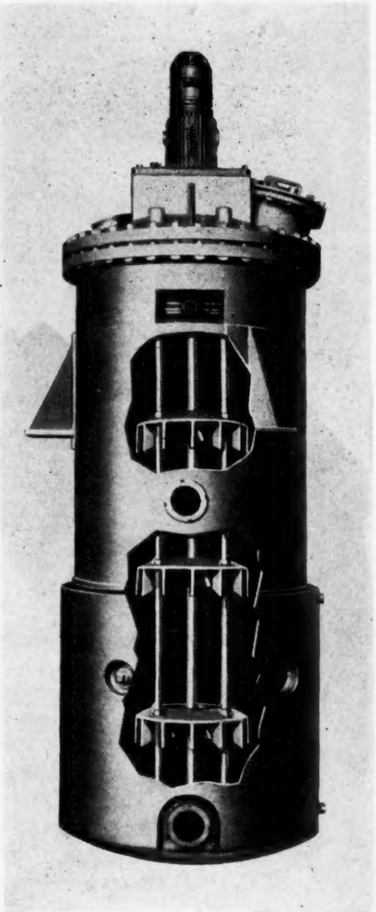
Pliofilm Packaging

The Naturalpak process and apparatus was developed to make possible the preservation and sterilization in an inexpensive package of all food products now packed in tin cans and glass jars. The foods are placed in an envelope bag of Pliofilm, which is heat sealed and placed in sealed in vapor-tight containers. After sterilization of the food under heat, the bags are pressure cooled, removed from the cooking chambers, and placed in folding cardboard boxes. Each box is wrapped tightly in cellophane and then placed in shipping containers. If preferred, the products may be completely packed as described above before sterilization, thus eliminating rehandling. With this process it is claimed that the saving in shipping weight amounts to about 20%, while the saving in space is about 30%. *India Rubber World*, March, 1, 1940.

NEW EQUIPMENT

Gas Absorbers QC51

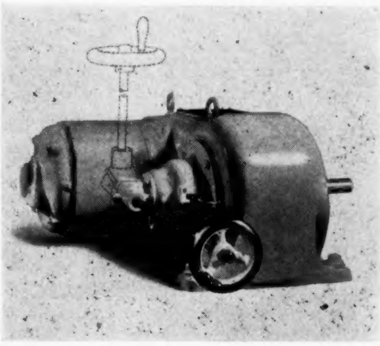
One of the larger manufacturers of machinery for the process industries has announced a new line of gas absorbers, embodying many refinements that materially increase efficiency and effectiveness. The accompanying illustration shows a



new gas absorber of stainless steel. This machine is 3′ in diameter by 7′ high and is designed for 60 lb. internal pressure and 100 lb. jacket pressure and is fitted with three 12″ gas absorber turbines. The new machines are built in plain and stainless steel as well as in a wide variety of non-ferrous metals and are available in a wide range of sizes.

Remote Motor-Control QC52

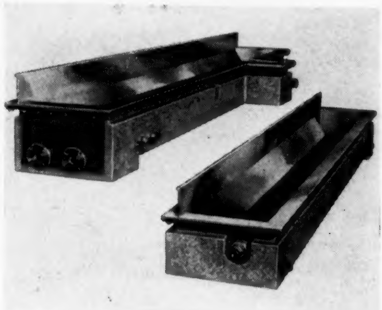
This control provides an accurate, simple means of selecting the desired operating speed of a Varidrive motor when



the motor is mounted beneath or above the driven machine or is otherwise inaccessible. The Varidrive control shaft may be extended at a ninety degree angle in any one of eight different directions. An enclosed set of helical right angle gears makes this possible. This right angle remote control permits the hand wheel to be placed within easy reach of the operator so that the exact desired speed can be maintained.

Wax Melter QC53

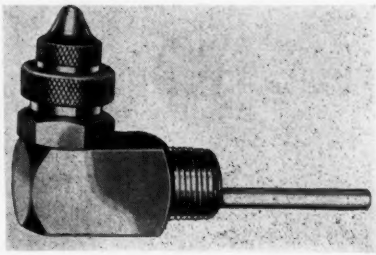
The wax melter shown in the illustration indicates a design which, with variations in dimensions, should be widely adaptable for melting wax, gummy or viscous substances and other materials which must not be subjected to possible contamination by the metal.



The inner melter tank is 10 ft. long, 18 inches wide, 12 inches deep and is made of stainless steel to insure maintenance of water white color of the wax. A shell of copper silicon bronze encases the tank and serves as a steam jacket for the tank. An outside housing made of galvanized steel and a layer of cork insulation cover the bronze steam jacket.

Pneumatic Atomizing Nozzle QC54

Illustration shows Pneumatic Atomizing Nozzle just placed on the market. Available with internally mixed round or flat spray. Is screwed directly into a pipe where liquid is maintained at a constant level—this same pipe serves as air supply header. Standard stock construction is of brass. Other metals can be specified. Nozzle is for chemical processes and humidifying in industrial processes where a constant proportion is to be maintained for intermittent spraying.



Other Equipment

Other developments and announcements in the equipment field are: QC55 Wall and floor mounted air heaters for use in crane cabs, truck houses, valve houses, locomotive cabs, scale rooms, garages, etc.; QC56 Electrically operated auxiliary switch especially designed for making and breaking several circuits simultaneously; QC57 New fitting for splicing wire rope and cable which saves a great amount of time and gives a better connection; QC58 New line of pulseless discharge Rotex pumps with helical gear rotors, in sizes under 3″ for capacity requirements from 5-100 g.p.m.; QC59 Immersion heater for oil tempering baths, made of high quality steel tubing having low watt density of about 11 watts per sq. in. of active tube surface; QC60 Improved hydraulic injection molding machine for plastics; QC61 Self-contained meter unit and power takeoff for accurately measuring and recording amounts of liquid received or delivered; QC62 Special blender for use in the mixing of liquids with other liquids, or with dry or semi-wet solids to produce syrups, emulsions, creams or pastes; QC63 Automatic reset timers and time delay relays adapted to time the operation of solenoid or motorized valves, motors, shakers, mixers, conveyers, etc. QC64 Balanced Monobloc centrifugal pump, wherein the motor and pump have been engineered as an integral unit of balanced functional design in contrast to merely adapting a motor to a pump. Sizes offered are from 1″ to 4″ with capacities to 1000 g.p.m. against heads up to 280 ft. QC65 New type grinder for the reduction of dry, light and fibrous material. Synchronized speed of the grinding elements, feeding, air circulation and power balance combine to form "an entirely new principle of forced lateral movement of material across the arc of impact."

Chemical Industries
522 Fifth Ave., N. Y. City.

I would like to receive more detailed information on the following equipment: (Kindly check those desired.)

QC 51	**QC 54**	**QC 57**	**QC 60**	**QC 63**
" 52	**" 55**	**" 58**	**" 61**	**" 64**
" 53	**" 56**	**" 59**	**" 62**	**" 65**

Name ....

Title .... **Company** ....

Address ....

Packaging

Containers

Elgetol, new dormant spray which combines ovicidal, insecticidal, fungicidal properties is packed in one gallon cans, with six cans to each carton. Such packaging makes for easier transportation, assures exact quantities when tank solutions are being made up.

Above—A shipping container that opens into a display stand has been developed by Hinde & Dauch for the Moon-Shine Chemical Company's "Sof-en-it."

Right—Climax Cleaner Manufacturing Company now packs its cleaning paste in this advertising shipping carton made by Hinde & Dauch Paper Co.

Below—Airport attendants handling new refrigerator carton to facilitate safe, speedy transportation of serums, vaccines, other perishable biologicals. Dry ice compartment insures a constant temperature of 32 to 42°. It was developed by Container Corporation of America.

Wildon Company, East Orange, recently introduced "Johnny-on-the-Spot" spot remover. Package features special applicator top which automatically releases just the right amount of fluid.

Handling and Shipping . . .

Many Specialty Packages Receive Awards in All-America Package Competition—5c to $1 Packages Are Judged in a Separate Contest For Low Cost Containers—Program is Now Complete for the Tenth Packaging Exposition—Packaging Institute Meeting is Set

CHEMICAL specialties contributed their full share to the sixty-two prize winning packages chosen early this month in the All-America Package Competition sponsored by *Modern Packaging* magazine. Entries were submitted by 2,000 manufacturers deluging the judges with more than 30,000 packages from which to select the "few that were chosen."

The competition staged each year since 1931 offers eloquent testimony to the growing emphasis on packaging as a sales aid. In that first contest, only 271 packages were submitted for judging. Yet, by 1938, the number of entries had grown to 23,000. The 30,000 packages submitted to the 1939 competition represent only containers actually marketed from the first of last year.

Among the more striking specialties which took prizes was the Shubador "Streamliner," product of Shubador Corporation, East Orange, N. J., consisting of a collapsible tube of shoe cream, onto the head of which is screwed a brush. By turning a key that rolls up the tube, the cream flows up to the brush and can be spread upon the shoe, all in one operation. Photographs of this and other specialty prize winners are contained in the rotogravure section this month.

Best Low Cost Packages

Seventeen packages were judged best containers for products marketed through syndicate stores during 1939 in a competition sponsored by *The Syndicate Store Merchandiser* at the Hotel Astor, Feb. 28 to March 1. This contest was limited to packaged merchandise selling from 5c to $1 through the variety chains.

Martin Ullman, president, Society of Designers for Industry, headed the judges committee which included Miss L. M. Geyer, buyer for G. C. Murphy Co., and Harry Herman, toilet goods buyer for H. L. Green Company.

Packaging Exposition Program

Complete program of Tenth Conference on Packaging, Packing and Shipping being held concurrently with Tenth Packaging Exposition, March 26-29 at N. Y. City's Hotel Astor has been released by Alvin E. Dodd, president, American Management Association.

Separate sessions will be held on packaging, and package machinery and production for first two days. First day packaging sessions include following papers: "This little package went to market"; "The package—a vehicle for consumer messages"; and "How much does the label weigh?"

At a luncheon meeting, Mr. Dodd will discuss: "Packaging—a job for management," and certificates of awards to winners in Irwin D. Wolf Packaging Competition will be presented. The afternoon session will consist of a description and visual demonstration of some recent and significant developments in packaging materials and processes by D. S. Hopping, Packaging Division sales director, Celluloid Corporation.

Packaging machinery and production sessions on March 26, will cover problems in package production, with special emphasis on liquid filling, dry filling, closures, wrapping, labelling, and cartoning.

W. R. M. Wharton, Chief, Eastern Food and Drug Inspection District, will talk on "Labeling packages under the pure food, drug and cosmetic act" during the second morning session. The afternoon session, presided over by Irwin D. Wolf, will consist of a "Packaging Clinic" with a panel composed of the membership of the Society of Designers for Industry.

Wednesday's packing and shipping sessions will cover: "The engineering aspects of adhesives"; "Fundamental principles of protection in shipping container design"; and "Consolidated freight classification—rule 41." In the afternoon, expert answers will be available on the following problems: color and ink, adhesives, liner board, wire bound containers, wood containers, corrugated and solid fibre containers, transportation, cooperage, car loading, and testing and design.

Packaging Institute Session

Special meeting to discuss packaging machinery industry problems will be held by Packaging Institute at Hotel Astor, N. Y. City, March 25, beginning at 2 P. M. and continuing through dinner. Semi-annual dinner meeting is scheduled for March 26, preceded by a cocktail party.

Cylinder Identification Proposed

Proposed simplified practice recommendation on color marking for anesthetic gas cylinders has been submitted to producers, distributors, and users by Division of Simplified Practice of U. S. National Bureau of Standards. Identification by color or a combination of colors is provided for seven different gases and two mixtures of gases.

Transportation of chemicals in motor truck looms as important potential with American Cyanamid putting two tank trucks of this type in service handling a corrosive solution. Tanks are lined with rubber by The B. F. Goodrich Company using its patented Vulcalock process of adhering rubber to metal. One of the most important advantages of this type of truck is its low center of gravity adding much to the safety factor.

We Feed "The Giant that Grew Overnight!"

• The essential raw material in the phenomenal growth of synthetic coating-resins, Maleic (Toxilic) Acid was first manufactured by National, first offered in commercial quantities by National, and first made available by National in its more convenient Anhydride form.

National produces Maleic (Toxilic) Anhydride, not as a by-product but direct by controlled catalytic oxidation of benzol. This is your assurance of an unfailing source of supply which is never dependent upon the production of other chemicals. We invite your inquiry for samples, technical information and quotations.

NATIONAL QUALITY

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NATIONAL ANILINE & CHEMICAL COMPANY, INC.

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BRANCHES AND DISTRIBUTORS THROUGHOUT THE WORLD

NEW CHEMICALS FOR INDUSTRY

Twenty-eight of New York City's important buildings constructed in miniature of Du Pont's "Lucite" methyl methacrylate is shown in this diorama of Manhattan. It was exhibited at the New York Information Bureau. Diorama Corporation of America produced it, from a design by Henry Dreyfus.

Digest of Chemical Developments in Converting and Processing Fields

VINYL RESINS *feature* PLASTICS REVIEW

A DRAMATIC review of plastics history was presented at a technical meeting in The Franklin Institute, Philadelphia, sponsored by Bakelite Corporation, Unit of Union Carbide and Carbon Corporation, last month. More than 400 technical men—engineers, chemists, molding men—were guests at this second in a series of meetings held in connection with the Bakelite Plastics Travelcade exhibit which is installed at the Institute.

Highlighting the session was a discussion by L. K. Merrill, Vinylite Division, National Carbon Company, Inc., on the chemical properties and resistances of "Vinylite" resins, new thermoplastic material. Mr. Merrill was one of the Cleveland development engineers assigned to the task of exploring the practical possibilities of the vinyl resins in articles of commerce for the molding industry.

"The resins, as a series, range in molecular weight from 6,000 to around 25,000" he pointed out "and are characterized by certain inherent thermoplastic and physical characteristics. Those in the lower molecular weight range possess the property of being softer and of greater plasticity at any given elevated temperature whereas the higher molecular weight materials are stiff, hard and lower in plasticity and flow behavior. In effect, therefore, a controlled mixture of these different molecular weights permits of compounds that are essentially self plasticized and removes the necessity for the use of addition agents to obtain variations in flow behavior. This feature is definitely taken advantage of and probably accounts, in part, for the desirable aging characteristics the materials exhibit.

Right (top to bottom)—G. Victor Sammet, president, North Industrial Chemical Company, Chairman of Bakelite's plastics meeting; L. K. Merrill, Vinylite Division, National Carbon; C. A. Norris, Bakelite, sales engineer. Below guests "get together," view plastics items after meeting.

"The commercial availability of copolymer vinyl resins pretty well coincided with the advent of injection molding as a

by

Charles J. Cunneen

Assistant Editor, Chemical Industries

commercial fabricating method in this country and while considerable work was done with these resins in compression molding, progress was retarded because of the limitations of the equipment available at the time, and our efforts were, therefore, primarily concentrated on the injection molding process."

One of the first things encountered in injection molding of copolymer vinyl resin, Mr. Merrill declared, was its seeming inherent sensitivity to thermal abuse in any fabricating process. Prolonged exposure to temperatures in excess of 225° F. caused a color change in the compound ending in heat decomposition of the material. At the present time, however, the heat stability of "Vinylite" resins has been raised, (as measured on a standardized time test of immersion in an oil bath at elevated temperatures to the beginning of color change) from 130 min. to approximately 300. A special heating cylinder for injection molding proposed for use with "Vinylite" was developed by the engineers during the course of their research.

Mr. Merrill went on to a discussion of the resistance properties of "Vinylite" resins. "One of the inherent characteristics of copolymer vinyl resin" he said, "is its chemical resistance. This has two aspects in the sense of (1) resistance to attack by other chemicals and (2) its exceedingly low moisture absorption. This plastic is unaffected chemically by a larger group of the commonly encountered materials, I believe, than any other single resin. A listing of those chemicals by which it is unaffected might include:

Practically all strengths of all mineral acids including hydrofluoric.
Sodium and potassium hydroxides.
Iodine, chlorine and bromine waters or tinctures.
Potassium permanganate and dichromate.
Silver nitrate.
Hydrogen peroxide.
Alcohols and polyalcohols.
Aliphatic hydrocarbons—but not the aromatics.
Oils, fats, and waxes, either animal, mineral or vegetable.

"The other chemical aspect of low moisture absorption, whether by high humidity atmospheric exposure or direct immersion, is of definite significance.

"Practically, this means two things to the molder: (1) the granular compound's operating behavior is not sensitive to material storage conditions prior to or during use, and (2) the finished parts are not subject to shrinkage, warpage or distortion through exposure to humidity or even in actual contact with water.

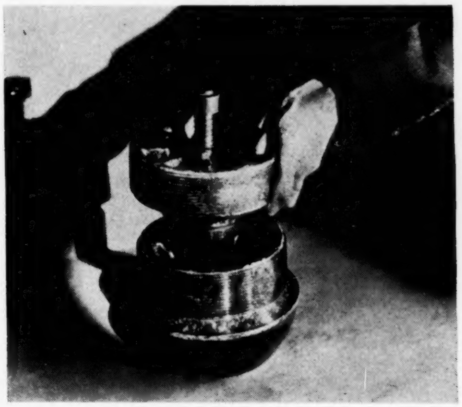
"The material is definitely non-flammable because its products of heat decomposition will not support combustion and this removes any usage or storage hazard for either the compound or the fabricated part.

"Along with good electrical properties common to several thermoplastics, copolymer vinyl resin exhibits the particular characteristic of extreme rigidity per unit of cross-section and this in company with high tensile strength. The unplasticized variety exhibits an elongation under strain of less than 2 per cent. That is really why it is rigid. Its actual tensile is comparable with the highest of other materials but it will not deform, appreciably, below its rupture point. Consequently, when struck at high impact velocities the energy is concentrated rather than distributed over a larger area as would be the case with a more elastic material, and rupture can occur. This is a feature to be considered in practical part design and is sometimes overlooked with many plastic applications.

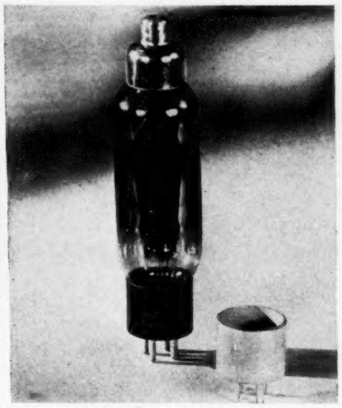
"This data is purposely obtained at two temperatures, that is 80° and 25° F., because the relation between the different materials may be entirely different depending on whether one is concerned entirely with room temperature conditions or whether low temperature factors may be involved. It is obvious that the room temperature advantages of either acetate practically disappear at 25° F. with copolymer vinyl resin, methacrylate, and polystyrene showing a much more constant behavior throughout this temperature range and "Vinylite" resins consistently topping that group of materials.

"Whether this data indicating greater impact strength at 25° F. than at 80° F. is actually true, I am not prepared to say, at least so far as its practical aspects are concerned. I believe, however, that injection molded articles made of the copolymer vinyl resins are definitely less affected in respect to this property by low temperature exposure than any of the other available materials."

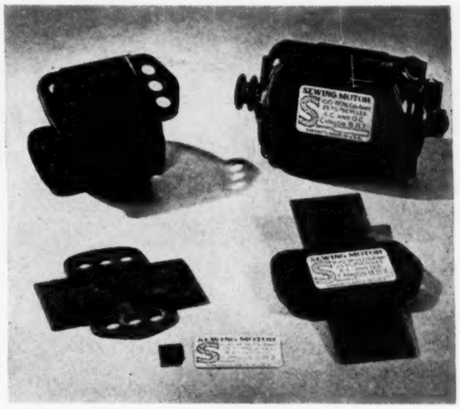
Mr. Merrill then demonstrated the rigidity of "Vinylite" resins as compared with acetate, and butyrate plastics through the medium of three tooth brush handles attached to an upright backboard. The "Vinylite" handle loaded with a 2 pound weight showed slightly less deformation than either of the other two handles bearing only 1 pound weights.



Large valve assembly, built to withstand pressures over 170,000 pounds is produced from phenolic impact material for toughness, oil resistance.



This power tube base of general-purpose phenolic materials is now replaced by phenolic low-loss material.



Molding blanks were chosen for housing of electric sewing machine motor because of electric insulating properties and exceptional strength.

He pointed out, however, that the safe usage temperature of "Vinylite" resins at present is not in excess of 150° F. due to its temperature-plasticity behavior. Therefore, at or below a certain temperature, it retains its normal rigidity, but when that temperature is exceeded, the degree of distortion may be worse than with materials which exhibit a broader softening range distortion behavior.

The effect of color on the heat distortion factor was brought out in a test during which molded parts were placed in a closed container under glass. Subject to direct solar radiation, the parts reached a temperature of 158° F. for a black article, 144° F. for a white one with an internal air temperature of only 127° F. In this test, the black part distorted and the white one did not, simply due to the difference in color energy absorption.

Following Mr. Merrill's discussion, C. A. Norris, Sales Engineer, Bakelite Corporation, read a paper on "New Developments in Molded Plastics" in which he reviewed the inception and growth of the plastics industry. After describing the order in which the different plastics were developed, he launched into a discussion of their properties and uses as outlined on the "Plastics Comparator" chart reproduced on this page.

"The numbers," Mr. Norris explained, "indicate the relative values, starting with number one as best. This chart reveals the importance of considering not only the most essential property or characteristic required in a molded plastic part but also the necessity of considering other properties which may affect the part in service. For example, if color is the paramount consideration, don't conclude that the plastic material rated first in color has all the other desirable requirements. On the other hand, if you require strength, it should not be assumed that dielectric properties or dimensional stability go with it.

"As an example of the way this Plastics Comparator can be employed in the selection of the proper material for a given part, let us choose an automobile distributor head as a specific application and see how it works out.

"In the first group toughness is a property to be desired and we find the thermoplastic materials together with shock-resistant phenolic as being most suitable. Flexural and tensile strength are not highly important, nor is the matter of color. Cold flow on the other hand must be considered. Here all the phenolic materials appear to be suitable, but there is a real question as to the suitability of the thermoplastics particularly acetate which is rated in last place.

"In the next group of properties we have only to consider water resistance. Polystyrene is first, vinyl is second, and phenolic low-loss and heat-resistant are tied for third.

"In the third bracket we have dimensional change on aging and heat resistance to be reckoned with. On aging we find the following materials in the order of their suitability:

1. Heat-resistant phenolic.
2. Low-loss phenolic.
3. Vinyl.
4. General-purpose phenolic.

"On heat resistance the order is:

1. Heat-resistant phenolic.
2. General-purpose phenolic.
3. Low-loss phenolic.
4. Aceto-butyrate.

"In the final group dielectric strength and moldability around inserts are the most important. In regard to dielectric strength we have:

1. Urea.
2. Polystyrene and methyl-methacrylate.
3. General-purpose phenolic.

"On moldability around inserts the phenolic materials have an advantage over all the others.

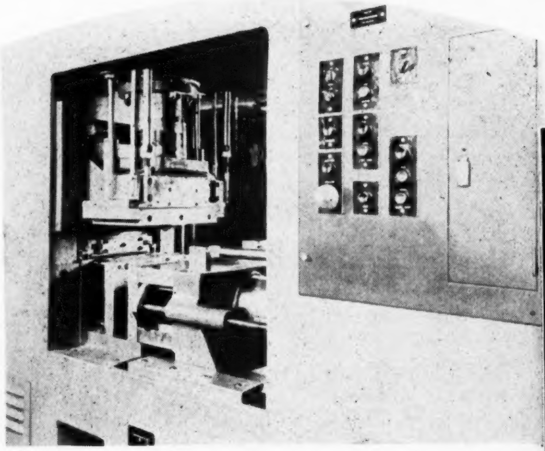
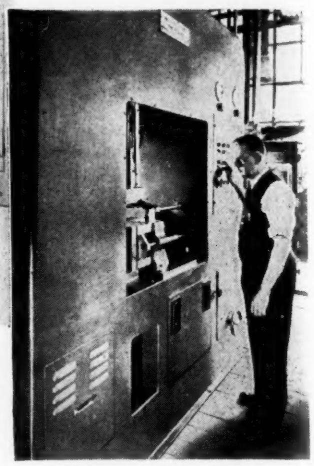
"From this survey it is apparent that low-loss phenolic is the material best suited for the application in question. This is further supported by actual tests made by a large automotive company.

"However, the general-purpose material costs less, not only in the price per pound but also due to its lower specific gravity. While it may not be the best material for the job, it is amply suitable, and therefore, is commonly used in the manufacture of distributor heads."

Mr. Norris went on to discuss ideal plastics for a wide range of products, giving the reasons why each was most desirable in the specific instance. His subjects, illustrated by slides thrown on a screen overhead, ran the gamut from valve asssemblies for oil well drills to domestic imitation jewelry made of polystyrene.

Featured in detail was a recent British development—a molded plastic coffin, used to illustrate the trend toward larger molded articles. A special press was built for the operation, with a 42-inch main ram and two 15-inch pull-backs. The unit is rated at 4,000 tons with a line pressure of 5,000 pounds per square inch.

The mold charge consists of seventy pounds of phenolic material in the form of large chips averaging about three inches in length and one-eighth inch in thickness. The charge is preheated and carefully distributed in the mold. The mold closing time is approximately sixty seconds and the time required for polymerization is only eight minutes.

This automatic transfer press gives indications of becoming the universal molding machine. Tests lead researchers to believe it can be used for injection molding of thermoplastic materials as well as compression and transfer molding.

Mr. Norris was careful to point out, however, that despite tremendous possibilities of plastics, there are some jobs in which the "best material in the world" is cast iron. On other applications, he said, glass may be best suited.

The speaker then traced the history of fabrication marking each milestone in its progress from the first crude hand molds to present day high speed automatic molds. It is interesting to note that the first Bakelite molded parts were produced in molds built for the production of hard rubber articles.

The lag of fabrication methods behind laboratory advances in plastic materials was a decided handicap to the industry during its early years. Recently, however, the slack has been taken up as the attention of machinery manufacturers became focused on the rapidly growing plastics field.

One of the first fully automatic molding presses was developed by John Lauterback. It operates on a rotary principle with twenty or more individual hydraulic rams mounted on a revolving table. The mold charge is fed, and completed parts removed automatically.

The F. J. Stokes Machine Company is manufacturing an automatic press, with a capacity of about fifteen to twenty-five tons total pressure.

Another automatic press, developed by the Boonton Molding Company, performs the complete operation from feeding the charge to depositing the completed part in the shipping carton.

Recent strides made in transfer molding, however, have opened new fields for plastics. The process is similar to injection molding of thermoplastics, inasmuch as the mold is closed empty, then the material is transferred in a plastic state from an auxiliary pressure pot into the cavities of the mold through suitable openings or gates. This method has made practical the production of parts that would be crushed under high and unbalanced pressures encountered in compression molding.

While transfer molding was invented by Mr. Frank Shaw, some years ago, it has just recently been applied to automatic operation. Still, an automatic transfer press, produced through the combined efforts of the Shaw Insulator Company, and Watson-Stillman Company, gives indications of becoming the universal molding machine. Tests conducted on the press furnish grounds for the belief that it can be used for injection molding of thermoplastic materials as well as compression and transfer molding of the thermosetting group.

PLASTICS COMPARATOR

Plastic Material	Toughness (Impact Strength)	Flexural Strength	Tensile Strength	Color	Cold Flow	Water Resistance	Acid Resistance	Caustic Resistance	Solvent Resistance	Dimensional Change on Aging	Heat Resistance	Flammability	Heat Insulation	Specific Gravity	Hardness	Loss Factor	Resistivity	Dielectric Strength	Moldability Around Inserts
Phenolic: General Purpose	10	3	3	7	1	6	3	4	1	4	2	3	2	8	5	10	7	4	1
Phenolic: Low-Loss	8	3	7	7	1	3	4	4	1	2	3	1	7	12	3	4	3	3	1
Phenolic: Heat-Resistant	10	4	8	7	1	3	4	4	1	1	1	1	7	13	2		8	8	1
Phenolic: Acid and Alkali-Resistant	11	6	8	7	1	4	2	3	1	5	3	2	2	5	4			7	2
Phenolic: Shock-Resistant	2	1	5	7	1	7	4	5	1	6	3	4	3	10	5		9	8	1
Phenolic: Transparent	7	1	3	7	1	4	2	3	1	5	3	2	2	6	4	7	5	6	2
Urea	9	1	1	1	2	9	4	4	1	7	7	5	5	11	1	9	4	1	3
Polystyrene	7	4	7	5	4	1	1	1	3	3	6	6	1	1	6	1	1	2	5
Cellulose-Acetate	4	6	9	4	8	11	4	6	3	9	5	6	4	7	9	8	6	5	4
Aceto-Butyrate	1	5	10	4	6	8	4	4	3	8	4	6	6	4	8	3			4
Ethyl-Cellulose	3	2	6	3	7	10	4	2	3	8	5	6	4	2	8	2	2	1	4
Methyl-Methacrylate	6	1	4	2	5	5	2	2	3	8	9	6	2	3	7	5		2	5
Vinyl (No Filler)	5	1	2	6	3	2	1	2	2	3	8	6	2	9	7	6	3	1	4

CHEMICAL SPECIALTIES

Best-Test Paper Cement, product of Union Rubber & Asbestos Company, appears in editorial rooms, offices where there are photographs to be mounted on paper board, hence the ruler, pencil, and triangle. It was recently packaged in these Phoenix Cone Top cans. Rodney D. Heetfield photograph.

INDUSTRIAL · HOUSEHOLD · AGRICULTURAL

Production Tips On

No reference is made in this article to the highly successful specialties shown above.

DISINFECTANTS, ANTISEPTICS, GERMICIDES

DR. Elliott C. Cutler, Professor of Surgery at Harvard, is reported to have said, at the recent Congress of Surgeons "Most germicides are no good. If they kill bacteria, they also kill the body cells around the bacteria, and hence do as much harm as they do good. The best thing I know of is plain soap and water."

Previous investigators have shown that soap has antiseptic properties, and we soap chemists like to subscribe to this premise. Moreover, the declaration of Dr. Cutler contains the challenge that the best antiseptic has not yet been produced. Obviously here is food for thought and research. Nevertheless, the Bureau of the Census reports the production of $6,314,352 worth of disinfectants alone, for the year 1937.

Antiseptic materials and methods, crude as they were, have been used as long as the written word. It is less than 100 years since Pasteur showed the relationship of micro-organisms to disease, a discovery which helped Lister to lay the foundations of antiseptic surgery. The record shows that before Lister, post-operative mortality in England was 41% in the large hospitals, and 62% in Paris. At that time, says Wrench in his "Life of Lord Lister," one could recognize his proximity to a hospital "by the stench of human putridity it contained." On the other hand it was recently reported that post-operative mortality has been reduced to 3%.

Both physical and chemical methods of antisepsis were and are being used. Egyptian mummification, desiccation of foods, cauterization by heat and ultra-violet sterilization are physical means. In ancient Greece, tar and sulfur were burned to arrest pestilence. Sores were treated with various gums and oleoresins. The burning of herbs, roots and essential barks as incense had germ destroying effects.

In modern life, antiseptics and disinfectants are used in every household. Municipal sanitation includes not only the preparation of sanitary water supplies, but also the sanitary removal of sewage.

Chlorine Disinfectants

Every large city treats its water with alum or ferric sulfate before filtration, and doses it with chlorine. In installations, having a supply of fairly pure water, calcium hypochlorite is used. Sewage effluents are treated with chlorine and 99.9% removal of *B. coli* has resulted from this treatment for ten minutes.

Benjamin Levitt
Chemical Consultant

Certain communicable diseases may be contracted while swimming in public pools and so the water is chlorinated to maintain at all times a residual chlorine content of 0.3 to 0.5 p.p.m. For guarding against "Athlete's Foot" infection, foot baths should be provided which contain 500 p.p.m. available chlorine. This may be made by dissolving 0.4 pound of high test hypochlorite in 6 gallons of water. Hypochlorite solutions are used in sanitizing the premises, as well as in the laundry.

The U. S. Public Health Service requires that milk-house utensils be exposed to 50 p.p.m solution of chlorine for at least 2 minutes. The cows' udders are wiped with a cloth dipped in hypochlorite solution before milking, and the milker is required to dip his hands in such a solution. Chlorine disinfectants are used in shellfish shucking plants to sanitize utensils and premises. Chlorine rinse water has been recommended for use in restaurants, and U. S. patent 1,901,434 describes a detergent compound for dishwashing, which contains chlorine and other germicides. Chlorine disinfectants are used in food handling establishments because they are non-poisonous in effective concentrations, leave no stains, decompose readily to common salt after they have done their work, act as deodorants which, leave no residual odor, and are inexpensive. These disinfectants are rated by their available chlorine content, which is really an index of their oxidizing capacity.

The usual household disinfectant and bleach is a 5% solution of sodium hypochlorite. It is produced on a large scale by passing chlorine into a caustic soda solution.

This product, better known as Modified Dakin's Solution, consists of an aqueous solution of chlorine compounds of sodium, containing not less than 0.45% and not more than 0.50% of NaOCl, equivalent to 0.43-0.48% available chlorine. This is produced by triturating the necessary chlorinated lime in 400 cc. water, gradually added, and dissolving the required exsiccated sodium phosphate in 400 cc. water heated to 50° C. (122° F.). Add the phosphate solution to the chloride of lime mixture. Allow to stand 15 minutes. Filter and wash the precipitate, making the final solution up to 1000 cc. or to contain 0.48% NaOCl. (The method in U. S. P. X1 is slightly different).

The chemicals are used in the following proportions:

% Avail. Cl. in Chlor. Lime	Gm. Chlor. Lime for ea. 1000 cc. sol.	Gm. Exs. Sod. Phos. per 1000 cc.
20	29	38
30 (U. S. P.)	20	20
35	17	20
65 (H T H)		

Liquor Sodae Chlorinatae U. S. P. X.
Labarraque's Solution

Monohydrated Sod. Carbonate	70 Gm.
Chlorinated Lime	100
Water, quantity sufficient to make	1000 "

This mixture is made similarly to the above.

Javelle Water, sodium hypochlorite solution containing about 1% available chlorine, is made as follows: 4 lbs. H T H (65% available chlorine) dissolved in 5 gallons water in a glass, earthenware, or rubber-lined vessel. Stir 3 minutes. Add 3 lbs. soda ash and stir again. Add enough water to bring the total volume to 30 gallons. After the precipitate settles, syphon off the clear solution, which will contain 1% available chlorine and store in brown bottles.

Cresylic Disinfectants

Liquor Cresolis Saponatus U. S. P. X1. is commonly used in hospitals and households. This is a compound of U. S. P. cresol which is made soluble by means of linseed oil soap. The formula is as follows:

Cresol	500 cc.
Linseed Oil	350 "
Potass. Hydroxide	14.5 Gms. (85%)
Sodium Hydroxide	37.05 " (95%)
Water q. s.	1000 cc.

The cresol and linseed oil are mixed together and the alkalies dissolved in 50 cc. water, are added, and the mixture is stirred while heating to 70° C. (158° F.), until a portion dissolved in 9 volumes of water, gives a clear solution. Cool and add water sufficient to make the product measure 1000 cc. For a commercial disinfectant of this type, cresylic acid and other vegetable oils may be substituted, using the equivalent of the alkalies, or either one of them, at the manufacturer's option. This disinfectant has a phenol coefficient of 3.

The Bureau of Animal Industry lists preparations of saponified cresol solution which meet certain requirements for official disinfection of cars, boats, other vehicles and premises This type of disinfectant may also be used as a sheep dip, when used in 1% solution in water, to eradicate ticks, and is very efficacious if the flock is given two dippings 24 to 28 days apart. However, as the sheep are dipped, the strength of the solution rapidly deteriorates, so that by the time 18 lambs have been dipped in 60 gals. solution it has deteriorated almost 50%, according to Farmers' Bul. 198, U. S. D. A.

Emulsified Coal Tar Disinfectants

These consist of coal tar oils and tar acids emulsified either with sodium resinate or, as in the higher coefficient preparations, the emulsification is facilitated by means of sulfonated castor oil, using the xylenols to boost the disinfectant or coefficient value. They are sold with phenol coefficients ranging from 2 to 20.

The coal tar disinfectants are characterized by making milky emulsions when diluted with water, and by a more creosotic odor than the cresylic acid disinfectants. They are used for household and veterinary purposes.

Phenol coefficient is a figure expressing the rates of killing efficiency of a disinfectant, as compared with that of phenol, tested under identical conditions. The sample to be tested is diluted and the dilutions are arranged in a series of decreasing concentration (increasing dilution). To these a specified amount of the test organism of broth culture is added. At the end of fixed periods of time, a small portion of the mixture of diluted disinfectant and test organism is transferred to a nutrient culture medium, and incubated. No growth in the sub-culture indicates that the organism has been killed. The greatest dilution (weakest concentration) of the disinfectant which kills in a definite time period is divided by the greatest dilution of phenol, killing in the same time period. This ratio is the phenol coefficient.

Pine oil disinfectants are solutions of steam-distilled pine oil in saponified rosin. Other means of emulsification may be used, such as soaps of naphthenic acids, which are byproducts from petroleum refining, or soaps of oleic acid.

Hygienic Laboratory Pine Oil Disinfectant is produced as follows:

Rosin	400 Parts
Pine Oil	100 Parts
25% Sod. Hydroxide	200 "

The oil and rosin are heated together to about 80° C. and the caustic soda solution added. The liquid is vigorously stirred for 10 minutes. Water may be added to make the product up to its original 1600 parts. The phenol coefficient when using a good grade of pine oil is between 3 and 4.

This type of product is used for disinfecting premises, for adding to scrubbing water. Bul. 989, U. S. D. A., states that pine oil emulsions failed to kill *M. aureus* and *B. anthracis* in any dilution. When using pine oil emulsion, five times the maximum dilution strength should be used against *B. typhosus.*

Various mixtures are made to simulate pine disinfectant by substituting kerosene or other mineral oil for part of the pine oil. Such compounds are used merely as deodorants.

Besides the disinfectants already described, there are thousands of chemicals that have disinfecting and antiseptic powers, when used in special cases, for example: 4-amino biphenyl compounds; crystalline addition products of 4-amino biphenyl and benzoic and salicylic acids may be used as disinfectants. French Patent 812,913 calls for iodoform condensed with guaiacol in the approximate molecular proportion of 1:3 and used as antiseptic. U. S. 2,103,999—Silver oxide ground in a vehicle of paraffin hydrocarbon, is used in the treatment of ulcers. U. S. 2,105,197 describes an ointment using salicylic acid, mercury salicylate and chlorobutanol for dermatomycosis, epidermomycosis, and epidermophytosis.

A discussion of modern bactericides and antiseptics would hardly be fair without mentioning several of the more recent chemotherapeutic discoveries, which are apparently the greatest since Erlich discovered salvarsan, the antisyphilitic, about 34 years ago. Although there are many disinfectants with which to sterilize local infections, there has been nothing which the body could tolerate in quantity sufficient to destroy bacteria until 3 years ago, when sulfanilimide appeared. In the sulfanilimide group are sulfanilimide itself, sold as Prontylin, Streptocide, Prontosil Album and Lysococcine. Prontosil, also called Prontosil Flabum; neoprontosil or prontosil soluble; benzyl sulfanilimide also known as Septozine and Proseptosine; sulfanilyl sulfanilimide called Disulon; sulfanilyl dimethyl sulfanilimide, called Uliron; sulfapyridine known as M & B 6983 and Dagenon; 4, 4'-diamino diphenylsulfone. It is said that 33 different ailments respond to these chemicals, but unfortunately these chemicals have proved of little value in the treatment of the common cold.

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H T H Literature—Mathieson Alkali Co.
Ferrisul—Monsanto Chem. Co.
U. S. P. X and X1.

CHEMICAL SPECIALTY *News!*

C. P. Gulick Re-elected President, National Oil Products, Succeeding John H. Barton—Pyrethrum Labels—Specialty Company News

Charles P. Gulick

CHARLES P. GULICK, one of founders, National Oil Products, was re-elected president at March 4 stockholders' meeting, to succeed John H. Barton who retired March 1. Mr. Gulick was president from 1932 until 1938 when he resigned that position to become Chairman of the Board of Directors, a post he continues to occupy in addition to the presidency.

Other officers re-elected were: Perc S. Brown, G. D. Davis, and Thomas A. Printon, vice-presidents; Ralph A. Wechsler, treasurer; A. A. Vetter, secretary. Richard N. Gulick, William A. Coolidge were re-elected directors together with all officers. The directorate, however, was reduced from nine to eight due to the retirement of Mr. Barton.

Mr. Gulick was treasurer of National Oil Products since its inception in '07 until '32 when he became president. He is also president and director of following subsidiaries: Metsap Chemical Co., Admiracion Laboratories, Nopco Chemical Co., Vitex Laboratories, Vitab Corp., and Frozen Sunshine.

In addition, he is president of Republic Yeast Corp., and the N. J. Social Hygiene Association, Newark; vice-president, Newark Athletic Club; member East Orange Board of Education; board member of Harrison National Bank; Newark Rotary Club; Newark Y.M.C.A.; Chemical Alliance and Brown Jeklin & Company.

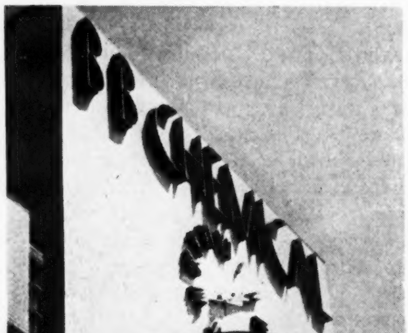
National Oil Products operates offices and plants in Harrison, N. J., Chicago, Boston, Cedartown, Ga., and Emeryville, Cal.

Ultra Establishes Plant

Ultra Chemical Works, Inc., Paterson, N. J., establishes Chicago plant under corporate name of Ultra Chemical Company, Inc., for manufacture of floor waxes, household chemicals.

Insecticide Label Rulings

Food & Drug Administration has advised N. A. I. D. M., that pyrethrin content now required on labels of pyrethrum powder must specify content of materials "when actually sold over the retail counter."



An unusual view of the attractive building of the B B Chemical Co., Cambridge, Mass., manufacturer of a wide variety of specialties.

Administration also suggests, as least complicated label for fluoride-pyrethrum mixture, on hypothetical fifty-fifty combination, following style:

Active Ingredients	
Pyrethrins	0.4%
Sodium Fluoride	48.0%
Inert Ingredients	51.6%
Total	100%

This takes into consideration a sodium-fluoride of approximately 96% purity, and pyrethrum powder of 0.8% pyrethrins.

Wants 'Approval Seals' Banned

Approval seals of Good Housekeeping Institute and of the American Medical Association, could not appear in advertisements unless sanctioned by the Federal Trade Commission under provisions of a bill sponsored by Representative William Lemke in the House. Bill claims seals attached to certain products are "unfair competition" because products of similar quality would suffer because of not having such "approval".

DuPont Building Laboratory

Du Pont starts constructing new laboratory for insecticide, fungicide research by Grasselli Pest Control Research Section at Wilmington Experimental station. Also authorized is new larger unit as addition to Nemours building.

Fels-Naphtha Pays Bonus

Fels-Naphtha Soap Company announces 1939 employee bonus ranging from 13 to 40 per cent. of annual wages or salaries, based on length, grade, quality of service.

Bott Talks On Experiments

W. E. Bott, Bott Chemical Specialties, gave an illustrated talk on experiments in the plant field before Toledo Horticultural Society, Toledo.

Chipman Issues Booklet

Chipman Chemical, Bound Brook, issues 1940 General Products Booklet describing its insecticides, fungicides, weed killers, paints.

Koppers Awarded Contract

The Koppers Co. has been awarded a contract by Dominion Steel and Coal Corp., Ltd., for the construction of a light oil refining plant and new by-product recovery equipment to be erected at Sydney, Nova Scotia.

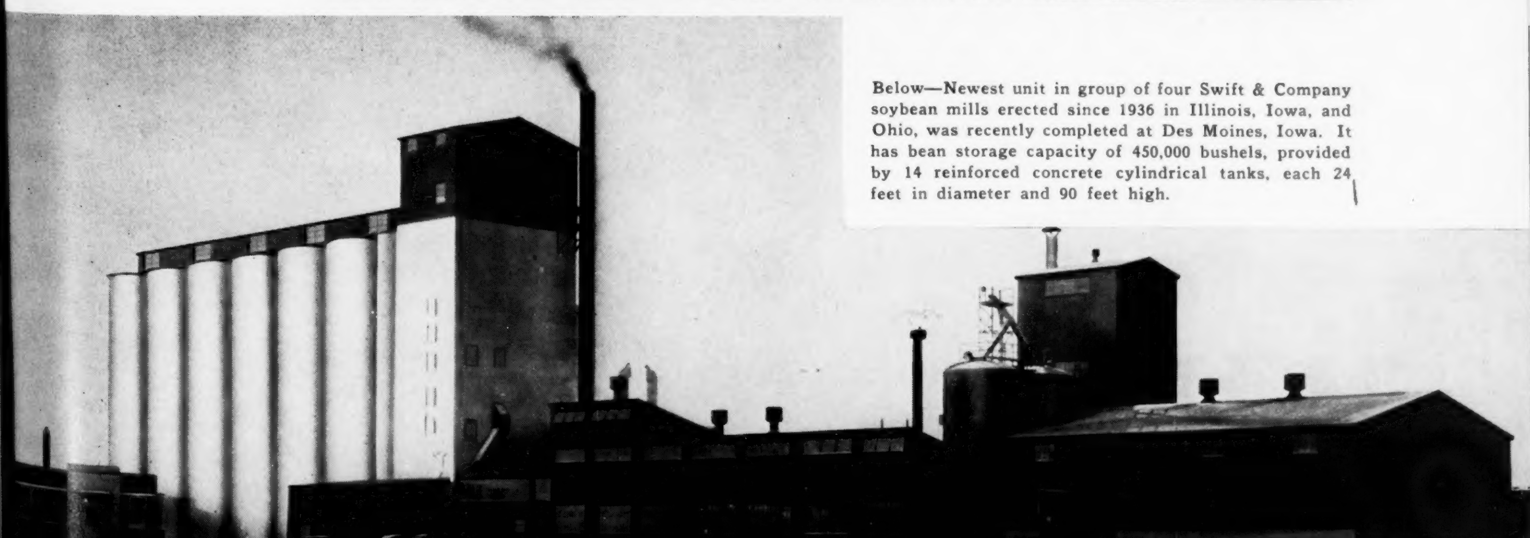
Hewitt Rubber Moves

J. M. Cranz Co., Buffalo, N. Y., distributors of Hewitt Rubber products in the Buffalo area, have moved into much larger quarters at 1280 Main st.

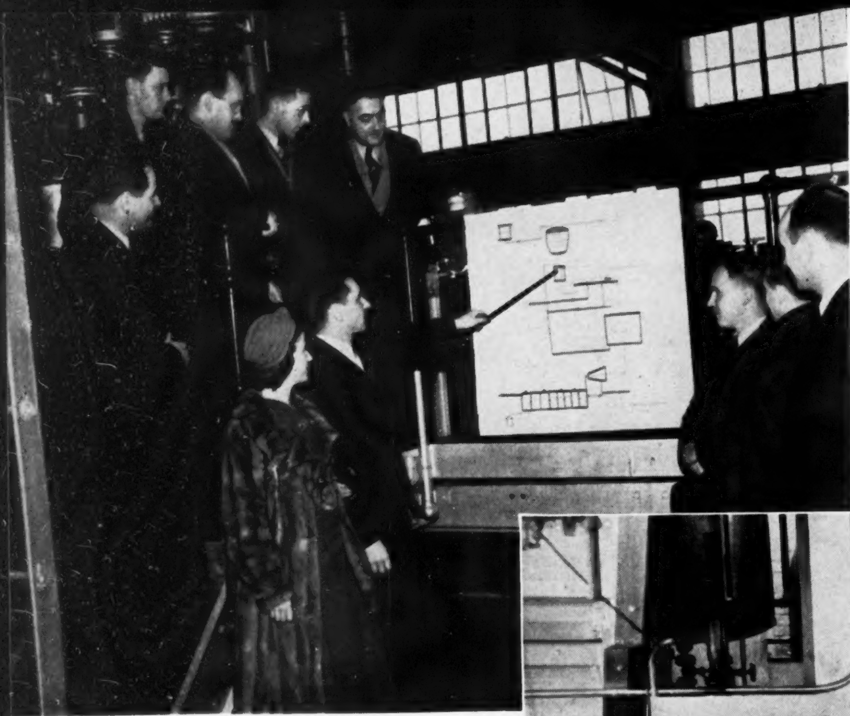
This is "Toncan Charlie" who headlined recent air-conditioning show at Cleveland. Made of Republic Steel's Toncan Iron, he has a standard hot air furnace for torso; other members are flues.

Above—Lucky pair, Miss Clara C. Bordona, secretary to late J. Harvey Gravell of American Chemical Paint, and Alfred Douty, chief chemist. They were among employees who shared legacy of $3,000,000 business.

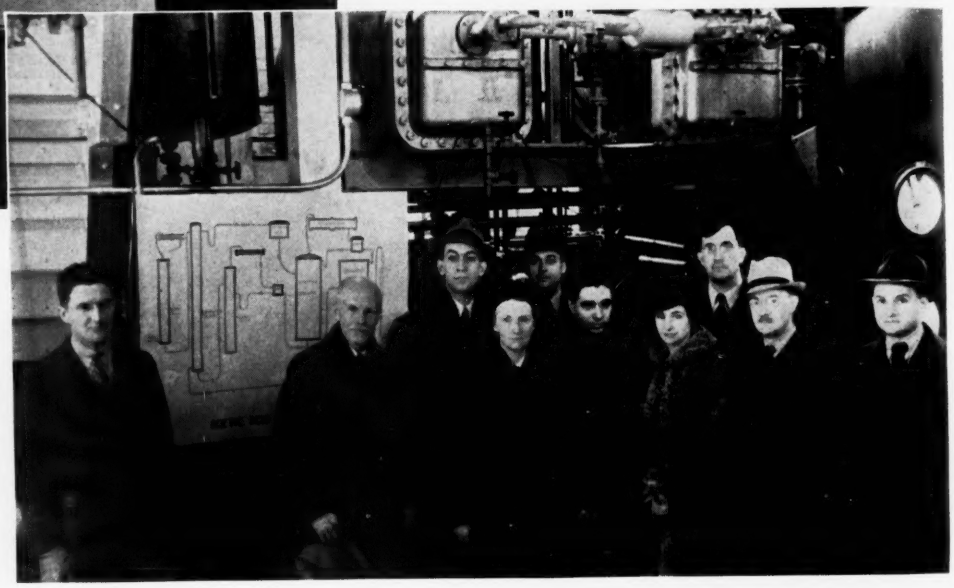
Right—New Research and Development Laboratory of Standard Oil at Richmond, Cal. It contains 12 laboratories, more than 30 offices for engineers and technicians as well as fully equipped technical library.



Below—Newest unit in group of four Swift & Company soybean mills erected since 1936 in Illinois, Iowa, and Ohio, was recently completed at Des Moines, Iowa. It has bean storage capacity of 450,000 bushels, provided by 14 reinforced concrete cylindrical tanks, each 24 feet in diameter and 90 feet high.



Left—When Shawinigan Resins Corp., Springfield, Mass., held open house at plant, Hans Schliecher, chemist, told visitors what goes on behind scenes. Interested onlookers are: (on rail) C. S. Weber, Monsanto Plastics chemist; Warren Shafer, Pro-phy-lac-tic Brush chemist; R. B. Rice, Monsanto chemist; C. L. Hazelton, N. E. Laboratories chemist; Dr. Foster D. Snell, president, Foster D. Snell, Inc. On floor are: Mrs. C. K. Bump; Hans Schliecher; Dr. C. K. Bump, H. Hehner, both Monsanto chemists; Harold Weymouth, Shawinigan chemist.



Right—Stanley Wheeler, left, of Shawinigan Resins, used flowsheet to help explain the acetic acid recovery system to some of guests attending Shawinigan's open house. A Monsanto subsidiary, Shawinigan Resins manufactures new safety glass plastic, vinyl acetal in Springfield plant.

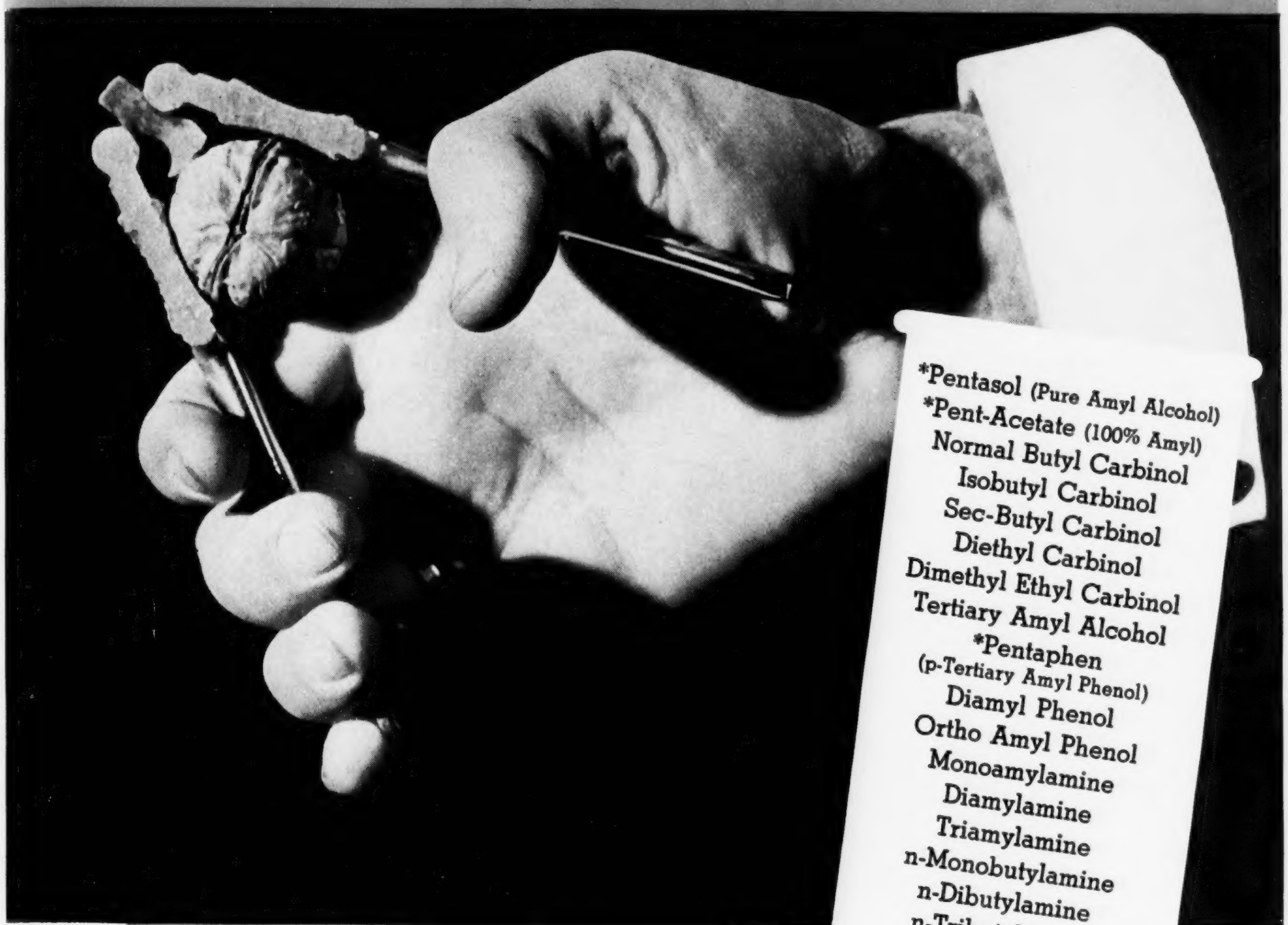
Above—Pell W. Foster, Jr., Foster-Wheeler, discussed Dowtherm Indirect Heating System at Tappi meeting.

Right—T. A. Carlson, Forests Products Laboratories, reading paper on "Bending Tests of Corrugated Board" at Technical Assn. of Pulp & Paper Industry meeting at Roosevelt Hotel, N. Y. City.

Above—L. S. Wilcoxson (left), co-author of two papers delivered at Tappi meeting, compares notes with Sam P. Robinson, chief chemist, Brunswick Pulp & Paper.

Right — Consolidated Water Power & Paper Co., exhibited color-printed roll of paper at its rooms at Waldorf - Astoria, Tappi convention general headquarters.

WE'LL HELP YOU CRACK IT!



*Pentasol (Pure Amyl Alcohol)
*Pent-Acetate (100% Amyl)
Normal Butyl Carbinol
Isobutyl Carbinol
Sec-Butyl Carbinol
Diethyl Carbinol
Dimethyl Ethyl Carbinol
Tertiary Amyl Alcohol
*Pentaphen
(p-Tertiary Amyl Phenol)
Diamyl Phenol
Ortho Amyl Phenol
Monoamylamine
Diamylamine
Triamylamine
n-Monobutylamine
n-Dibutylamine
n-Tributylamine
Monoethylamine
Diethylamine
Triethylamine
Monoamyl Naphthalene
Diamyl Naphthalene
Polyamyl Naphthalenes
Mixed Amyl Naphthalenes
Normal Amyl Chloride
Normal Butyl Chloride
Mixed Amyl Chlorides
Dichloropentanes
Amyl Mercaptan
Diamyl Sulphide
*Pentalarm
Amylenes
Diamylene
Amyl Benzenes
Diamyl Ether
SEMI-COMMERCIAL PRODUCTS
LABORATORY PRODUCTS
*Trade Mark Registered

Fifteen years of experience in the field of alkylation have trained Sharples research chemists in the art of "cracking" tough problems. One manufacturer may want a better lacquer solvent or a new corrosion inhibitor—another may need a different type of plasticizer or a more efficient flotation reagent—still another may have a process that has become antiquated and needs the help of modern research. These are the types of problems being solved every day by Sharples Synthetic Organic Chemicals—plus the help of Sharples Research and Use Laboratories. Write today for our new Booklet describing in detail these "newer" chemicals. Your copy will be mailed promptly!

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SHARPLES TRADE MARK SOLVENTS

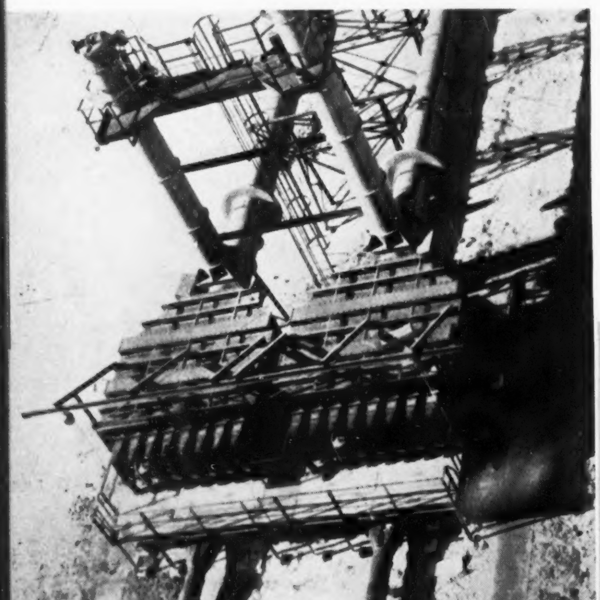
N. Y. Section A.I.Ch.E.

Above—L. P. Scoville, The Texas Company, was host at this table consisting of L. F. Dowding, Mr. Scoville, J. C. Neyland, J. A. Davies, and F. W. Weston.

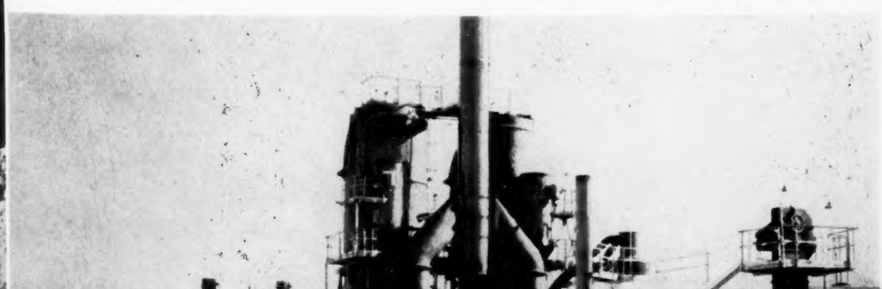
Below—J. V. Freeman, By-Products Sales Department, U. S. Steel; Dr. John C. Olsen, Brooklyn "Poly"; A. M. Taylor, consultant; and Walter J. Baeza, Industrial Research Co.

The speaker:—Col. A. Gibson, U.S.A., Chemical Warfare Service.

Above at the left—(standing) Dr. Benjamin T. Brooks, consultant, who introduced the speaker, at his right, Stephen L. Tyler, national secretary, A.I.Ch.E. At the right, New York Section, chairman, Dr. Chester L. Knowles, The Dorr Company, and Dr. Raymond J. F. Kunz, Cooper Union.



General Atlas Carbon recently put into production its new "Pelletex" plant at Guymon, Okla., two views of which are shown, below and left. Process consists of carbon laden gases carried through air cooling and water cooling systems, then through an electrical precipitator where black is separated from gases. Black is then led to screens, from there to pulverizer, then to the Pelletex machine whence it is fed to driers, and finally to packing machines.



NEWS OF THE MONTH

News Index

Modern Pioneers Receive Plaques in New York

All but four of nineteen scientists who received awards as "Modern Pioneers" from National Associations of Manufacturers at Waldorf-Astoria dinner Feb. 27, are pictured above. Top row: Charles Mills de Forest, proxy for Dr. Lee de Forest; John Van Nostrand Dorr; Dr. Karl T. Compton; H. W. Prentis, Jr., president N. A. M.; Dr. Edwin Howard Armstrong. Middle row: Robert L. Lund, chairman, N.A.M. Modern Pioneers Committee; George D. Graves, of Du Pont's Nylon group; Charles Frederick Wallace; Dr. F. C. Cottrell. Bottom row: Dr. Vladimir Kosma Zworykin; Dr. Irving Langmuir; Dr. Wm. David Coolidge; Edwin Herbert Land; Dr. George O. Curme, Jr.; Dr. Harry Steenbock; and Willis Haviland Carrier.

IN REVIEW

CHEMICAL INDUSTRIES

FERTILIZER TRADE FIGHTS U. S. WRITS

Department of Justice Subpoenas Ask That All Records Be Brought to Anti-Monopoly Investigation at Winston-Salem, N. C.—Gypsum Probe Started—Becket Re-Nominated—General Session To Open A.C.S. Convention

Bitterly flayed by a phalanx of more than twenty defense attorneys as reminiscent of the "Inquisitions of the dark ages," a 23-man Winston-Salem, grand jury coolly goes on with its appointed task of taking the fertilizer industry apart and peering inside.

Jury was impanelled at instigation of anti-trust division of the Department of Justice which alleges illegal monopolistic practices are rampant in fertilizer trade, and, according to defense counsel, asks six major companies to prove it.

Six companies cited are: F. S. Royster Guano Co., Swift, Armour, International Agricultural Chemical Co., American Agricultural Chemical Co., and Virginia-Carolina Chemical.

From outset of case, Feb. 13, courtroom war has been raging over validity of subpoenas asked by D. of J. lawyers. These would require ten year records of companies named to be transported to site of investigation. These include: corporation records, books showing stockholders' lists, officers, all minute books and records containing meeting of directors, committees, annual reports of officers, all books, papers, memoranda dealing with plant capacities, sales volumes, and any correspondence with named companies regarding fertilizer and "any other companies."

Judge Asks Compromise

U. S. District Court Judge Johnson J. Hayes, laboring under frowns of huge defense counsel battery, advised compromise when he heard that records of one company alone would require two boxcars to hold them. D. of J. lawyers then offered to accept certificates in place of corporation records, photostats instead of current records, and ten year records in installments of three years. But defense attorneys would have none of it.

Venerable E. Randolph Williams, Richmond attorney for Virginia-Carolina Chemical, flatly denounced the subpoenas as a "fishing expedition." D. of J. men could discover nothing wrong in lengthy examination of records at company's offices this year, he told court, and felt records were records and showed the same thing regardless of geography.

Other defenses attorneys chorused that subpoenas in their mildest form violated constitutional rights of companies involved. As this issue went to press, they were arguing vociferously to quash the subpoenas entirely.

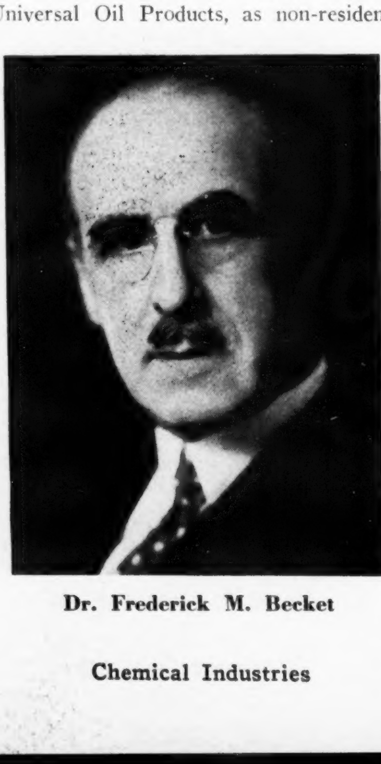
Gypsum Under Scrutiny

Second U. S. probe of monopolistic practices in building industry, announced Feb. 23, called on 12 leading gypsum producers to appear before special Washington grand jury with "books and papers bearing on situation." First industry under scrutiny of Attorney General Jackson's microscope was plumbing trade, in Cleveland, which set pattern for Winston-Salem fertilizer probe.

Investigation was inspired by President Roosevelt's call on Federal Trade Commission to discover whether marked increase in living costs was due in part to "monopolistic practices and other unwholesome methods of competition." Since then, D. of J. states, it has received numerous complaints that prices for gypsum products used in construction have been "high, uniform, and rigid for many years."

Chemists' Club Nominations

F. M. Becket, Union Carbide consultant, has been re-nominated as president of The Chemists' Club, New York City. Other re-nominations include Gustav Egloff, Universal Oil Products, as non-resident vice-president; Robert T. Baldwin, secretary; and Ira Vandewater, of R. W. Greeff, treasurer.



Dr. Frederick M. Becket

Other nominations were: Ralph E. Dorland, Dow Chemical, as resident vice-president; Robert J. Moore, Bakelite, as suburban vice-president. Trustees nominated were Howard B. Bishop, Pennsylvania Salt, and Thomas Midgley, Ethyl Gasoline Corp.

General Session at A.C.S.

General session, embracing all sections of A.C.S., will usher in Cincinnati convention at Netherlands Hotel, 2 p.m., April 8.

Session will feature three papers. Dr. H. A. Gardner, Director Scientific Section, National Paint, Varnish & Lacquer Association, will discuss "Drying Oils." Dr. William H. Bradshaw, Du Pont Rayon Department, and winner of Jacob Schoellkopf Medal, will talk on "Cordura," and Dr. Peter Debye, Nobel Prize winner in physics, visiting professor at Cornell, will talk on "Determination of Molecular Structure by Interference Methods."

This will be only general session of meeting at which approximately 600 papers will be presented. Divisional sessions will be held at Gibson and Sinton hotels as well as Netherlands. These will be conducted in nature of symposiums, with chairmen so far named as follows:

Chairmen Are Named

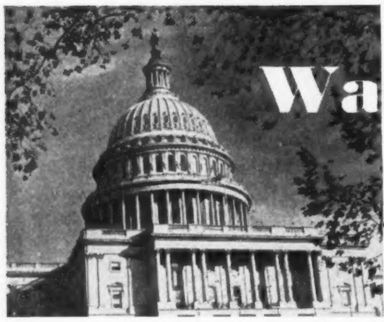
W. I. Patnode, General Electric, on Cellulose and Organic Plastics; Dr. H. H. Storch, Bureau of Mines, on Combustion of Solid Fuels; Dr. F. L. Miller, Standard Oil Development Laboratories, on Chemistry of Insulation; Dr. Frederick Fenger, chairman A.C.S. Division of Medical Chemistry, on Sulfanilamide and Related Derivatives.

Also, Dr. E. Bright Wilson, Jr., Harvard professor, on Application of Mathematics to Chemistry; Dr. Frederick D. Rossini, National Bureau of Standards, on Fundamental Chemical Thermodynamics of Hydrocarbons and their Derivatives; Prof Joseph E. Mayer, Columbia, on Phase Transition.

M. V. McGill, A.C.S. Chairman, Division of Chemical Education, and Teacher at Lorain, Ohio, High School, will conduct symposiums on The Future of Chemistry as a Specialized Science in High School curriculums. Participants will include: T. A. Nelson, Decatur (Ill.) High School; Professor L. L. Quill, Ohio State; Professor H. N. Holmes, Oberlin, and Prof. R. D. Reed, New Jersey Teachers' College.

Trade Agreement Supplement

U. S. Tariff Commission has issued supplement to "Reciprocal Trade—A Current Bibliography" issued in 1937, listing material referring to reciprocal trade agreements up to '39.



Washington

Russell Kent

DROWNING their doubts in hope, congressional leaders have applied pressure to speed up legislation in an effort to bring about an early adjournment. In spite of the accelerated pace which came in on the winds of March, the most optimistic adjournment estimate was June 1.

Russell Kent

With the change in pace there came also some changes in direction. Considering that 1940 is a political year, about the only certainty regarding this session of Congress is that of uncertainty. Two of the recent events have especial interest for the chemical industry. One concerns a sudden shift in approach to an old problem, water pollution. The other relates to an effort to obtain legislation for Federal aid to States in control of occupational diseases. Both of course, are applicable beyond the chemical industry.

For years, the subject of stream pollution has been before Congress. Two years ago, the Barkley-Vinson bill was passed, only to be vetoed by President Roosevelt on a technical point of intrusion into executive authority. Reintroduced in this Congress with the objectionable section corrected, the bill passed the Senate last summer and was reported to the House calendar with few changes, as the Barkley-Spence bill.

Co-operative Measure

In principle, the bill was a cooperative measure. It proposed to set up a division in the Public Health Service to cooperate with States in planning purification works. The Senate bill provided for grants-in-aid to assist in such works, and for loans to private as well as public improvements. The House bill eliminated the grants to private corporations, but otherwise followed the Senate bill closely.

But the conservation forces, which sought a compulsory measure, never gave up their fight.

Late in February, the House rivers and harbors committee revised the bill it had on the calendar and submitted a supplementary report. This bill eliminated all grants-in-aid and it transferred the loan feature from appropriations direct from the Treasury to Reconstruction Finance Corporation financing. This change was in line with congressional tendency of the session to hold down both immediate and anticipated appropriations, and to finance projects, where possible, through the R.F.C., outside the budget and outside the national debt figures.

On the eve of House consideration of this revised bill, the Isaac Walton Leaguers and other conservation interests reached a sudden compromise with the committee. They agreed to drop their fight to substitute the compulsory Mundt bill for the cooperative measure provided an amendment to the latter was accepted which would apply the terms of the Barkley-Spence bill to existing conditions, but would forbid establishment in the future of industrial plants or municipal sewage or similar systems whose discharge would pollute streams. This compromise was sent to a questioning Senate.

Sponsor Health Bill

Senator Murray of Montana and Representative Keller of Illinois, both democrats, sponsored the new health bill. Its chances for enactment at this session do not appear to be particularly bright, but it is important as an indicator if nothing more, for it would open the door to new definitions of industrial hazards to health. Organized labor has favored such a measure. The Department of Labor has been considering the subject for some time.

Summed up, this bill would subsidize State plans to prevent and control industrial conditions hazardous to the health of workers. The Secretary of Labor would direct the work. States would contribute to the expense. It would provide an appropriation of $1,000,000 the first year, $2,000,000 the second year, $3,000,000 the third year and thereafter "a sum sufficient to carry out the purposes of this act."

In a statement explaining his bill, Senator Murray said the problem is nationwide and that "no industrial employment is free from conditions capable of causing sickness, disability, and premature death."

"Most seriously exposed," the senator's explanation continued, "are the estimated 5,000,000 workers menaced by specific, reoccurring, recognized occupational diseases, i.e., lead poisoning, dermatitis, silicosis asbestosis, poisoning from benzol, carbon disulfide, mercury, radium, carbon monoxide, and about 20 more.

"Increasing use of new chemicals, new solvents, new processes are not only bringing new diseases but are producing an alarming increase in the known health disabilities."

Delay in amendments to labor legislation is irking some members of Congress, especially in the House.

With $50,000 additional to carry on its inquiry, voted without a word of debate, the Special House (Smith) Committee to Investigate the National Labor Relations Board recessed hearings at the end of February to prepare its interim report suggesting amendments to the Wagner Act.

May Submit Petition

If the House Labor Committee does not act on the suggestions within a few weeks after their receipt, proponents of change propose to submit a petition to discharge that committee and thus bring the subject to the floor for consideration. House leaders admit privately the belief the necessary 218 signatures would be attached to such a petition rather promptly.

The House appears inclined to go considerably further in Wagner Act amendments than does the Senate.

House passage of Walsh-Healey Government Contracts amendments, broadening that law, is indicated but serious controversy is certain if an effort is made to include penalties for infractions of the Wagner Act unless such charges have been upheld by a court. Disclosure that the Labor Board had attempted, without legislation authority and in the face of refusal to grant such authority, to arrange with the R. F. C. to withhold loans to firms charged with Wagner Act violations and with the Treasury to withhold government contracts in such cases has made this subject a sore spot with Congress. The Senate already has passed a bill broadening the Walsh-Healey Act.

Another legislative row over the Fair Labor Standards (Wage-Hour) Act is threatened. By mutual consent, action has been suspended in the House, where a rule was granted last summer for consideration of amendments, to afford the new Wage-Hour administrator, Col. Philip Fleming, an opportunity to demonstrate what he could do by administrative action.

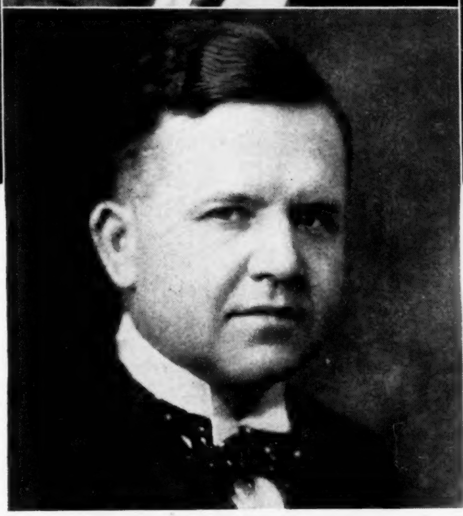
But whereas the former administrator, Elmer Andrews, was inclined to cling closely to enforcement within definitions laid down by his legal advisers, Colonel Fleming has inaugurated a policy of testing border-line cases.

(Continued on page 349)

Right—Herbert G. Moulton, elected president, American Institute Mining and Metallurgical Engineers, at '40 convention, with Institute Award winners.

Below—Alden B. Gerninger, presented with award certificate for paper "The Martensite Transformation in Beta Copper-aluminum Alloys," read at convention.

Above—Louis D. Ricketts, who was awarded James Douglas medal "distinguished achievements in the metallurgy of copper." Mr. Ricketts, who was 80 years old, died in Los Angeles March 4.



Everett L. DeGoyler, who was awarded Anthony F. Lucas medal "for initiating applied geophysics, directing early practical seismic exploration and fostering applied science in finding, developing, and producing oil."

(Continued from page 348)

Such warm supporters of the Wage-Hour Act as Representative McCormack, of Massachusetts, and Representative Ramspeck, of Georgia, both democrats, have served open warning in the House that unless excessive zeal in Wage-Hour enforcement is checked, the people may turn against the law as well as against its administration and "something will have to be done about it."

Congress continues its economy policy with regard to appropriations, all bills thus far having contained cuts below Budget estimates. But the Senate is determined additions shall be made to the Department of Agriculture supply measure by way of "parity" payments to farmers and additional money for surplus removal, which includes the much-publicized "stamp plan" of food distribution to the needy.

And the same spirit of caution regarding international relations which was an outstanding characteristic of the start of the session rides on a high tide. Typical was House action in passing the Senate-approved bill to double the lending authority of the Export-Import Bank, to $200,000,000. This was the so-called "Finnish loan" bill, although Finland was not mentioned in the measure and loans to any one nation were restricted to $20,000,000; none for purchase of military supplies. There was much talk of amending this measure to specify an unrestricted loan to Finland, but there was more talk than votes for the amendment. In fact, less than a third of the House membership voted on amendments, and barely a majority of the entire membership voted on the question of final passage.

The struggle over the Logan-Walter bill to provide that administrative agencies shall have definite rules of procedure, effective only after public hearings, and appealable to the courts and also to provide for court review of the facts as well as the law upon which orders are based grows in intensity.

Division Among Democrats

Strangely, this is a division among democratic members of both Houses and not a controversy between democrats and republicans. The Department of Justice advisory committee on administrative procedure will not make a final report until fall, and the effort is to forestall legislation until this study has been completed.

While Congress is striving to hold total appropriations within aggregate Budget estimate and thus avoid any necessity for either tax revision or an increase in the public debt maximum, the Treasury Department reported, in response to a resolution last summer by Senator Byrd of Virginia, that 31 independent agencies of the Federal government have outstanding about $7 billions in obligations, guaranteed fully by the Treasury, which are not reflected in public debt figures.

Contingent Liabilities

These are contingent liabilities, and are more than offset by assets. But Senator Byrd pointed out that the report shows more than $1 billion of loans made by these agencies are in default, both as to principal and interest and that property valued at $880,000,000 has been taken over for resale. It also was shown that 15 of these agencies, including the largest, are exempt from audit except by themselves.

Thereupon the Virginia senator began a drive to have all agencies audited by the General Accounting Office and he questioned, in the light of the figures, the proposal by President Roosevelt to recapture and turn into the Treasury $700,000,000 of capital and other assets from among such agencies.

HEAVY CHEMICALS

Upturn in Domestic Buying Seen Due

Confidence That War Will Not Drain Supplies Believed Cause of Reserved Buying—Shortage of Important Items Predicted—Exports Slipping—Tin Derivatives Higher—Silicofluoride Weak

LACK of over supplies evident in '39 final quarter seems a decided factor in new spirit of caution shown by buyers. Throughout last month there was little evidence of expanding commitments, most consumers hewing to the line of current requirements. Slackened pace became etched more sharply on general picture when producers cleared up fourth quarter backlogs during early February.

Inquiry from abroad took a fall. In some quarters, England and Italy are seen entering markets formerly supplied from here. Heavy recent purchases are also considered a factor. Foreign shipments are by no means minute, however. January exports, while under December, totaled $4,189,000 against $1,770,000 in '39. February is expected to slip a bit further, but it's still good business.

Upturn Is Forecast

Slump in domestic situation is expected to end in March. At month's end market began to develop bright spots. Spring buying is seen as stimulant to industrial production which should react favorably, in addition to normal seasonal upturn.

Contrasted against present dullness, is prediction of one informed factor that definite shortage of certain important chemicals and solvents will be felt during last half of '40.

Pricewise, copper sulfate, hitched to metal, slumped early during month, but snapped back on firming of primary market. Tin derivatives followed straits tin into higher ground, with immediate future indications distinctly on the up side.

Weakness developed in ammonium silicofluoride, potassium metabisulfite. Former dropped 1c, latter 5c. Among the agricultural insecticides, arsenate of lead went up, then down, finishing month off 1c. Calcium arsenate also slumped.

Recent arrival of cobalt oxide from Belgium bolstered small domestic stocks.

Important Price Changes

ADVANCED	Feb. 29	Jan. 31
Stannous chloride	$0.45½	$0.44½
Strontium chloride	.18½	.18
Tin straits	.47½	.45½
Tin crystals	.37	.36
Tin tetrachloride	.23¾	.23
DECLINED		
Ammonium silicofluoride, imp.	$0.11½	$0.12½
Calcium arsenate, c.l.	.06	.06¾
l.c.l.	.07	.07¼
Copper carbonate	.16½	.169
Lead arsenate, c.l.	.08½	.10
l.c.l.	.09½	.10½
Potassium metabisulfite	.13	.18
Sodium arsenate, c.l.	.07	.08
l.c.l.	.07¾	.08½
Sodium arsenite, c.l.	.06½	.07½
l.c.l.	.07¼	.08

Walker Chemical Formed

Walker Chemical Corporation, recently chartered in Rhode Island with Robert F. Walker, as board chairman, plans large scale production of nitro-cellulose starting next summer in 10 building plant now being constructed at Wood River Junction, near Westerly, R. I. John P. Walker, Providence, is president, and Bradford T. Bowen, now supervising construction, will be general plant manager.

Personnel

Dr. A. Lloyd Taylor joins technical staff of Oakite Products, Inc., N. Y. City in a move designed to expand Oakite chemical research facilities. He will also devote part of his time to technical field

Dr. A. Lloyd Taylor

service in connection with specialized cleaning materials used in product processing, plant maintenance operations.

Harshaw Elections

W. W. Lawson, was elected vice-president, charge of certain sales, and C. S. Parke, vice-president in charge of plants, manufacturing, at annual meeting Harshaw Chemical; W. B. Lawson, vice-president, resigned officially at same meeting. . . . Walter I. Nevius, has become consulting engineer for Commercial Solvents after resigning as director of engineering operations. . . . Sidney M. Winstein, ordered to research—of Apex Chemical Co., Elizabethport, N. J. . . . Charles E. Mayette joins sales engineering staff, Underground Steam Construction Co., Boston.

J. E. Cavelti, former head, chemistry department, Allegheny College, joins Seamless Rubber as technical superintendent. . . . Marshall Clark appointed director, sales manager, M. E. Wallace Company. . . . John M. Miller resigns from Firestone to become Providence factory manager, U S. Rubber. . . . Dr. J. H. Mueller joins technical staff, Vulcan Proofing Company, Brooklyn . . . Louis Garbi, specialist in hot and cold asphalt mixes, rejoins Pioneer Asphalt. . . . M. C. Swope resigns from Montgomery Bros. to enter own business at 3303 Richmond St., Philadelphia, as distributor of Union Aromatic Solvents, coal tars and specialties. . . . Ernest D. Wilson, former president, Zialite Corporation, has been appointed head of Department of Chemical Engineering and Chemistry at Worcester Polytechnic Institute.

Wilson Becomes Chairman

James Wilson has been elected board chairman, Shawinigan Chemicals, Ltd., succeeding Julian C. Smith, deceased; V. G. Bartram, former vice-president, general manager, becomes president, succeeding R. A. Witherspoon, who becomes executive committee chairman; other officers elected were: W. S. Hart, first vice-president; H. S. Reid and H. W. Matheson, vice-presidents; J. A. Fuller, secretary-treasurer.

I. J. Collins and George P. Torrence added to directorate of Industrial Rayon. . . . Edwin C. Jarm appointed to sales, technical development post by Lea Mfg. Co., Waterbury. . . . E. L McIlhenny made manager, alkali division, Detroit Rex Products . . . Dr. John Arthur Wilson resigns as Technical Director, Bona Allen, Inc., to resume consulting tanner and chemist practice in New York City. . . . Dr. Merle R. Meacham appointed manager Standard Oil of N. J. Baltimore, Charleston refineries and Baltimore printing plant, succeeding E. A. Rudigier, retired; Donald L. Ferguson succeeds Dr. Meacham as general manager, Bayway refinery. . . . Joseph S. Tolson, director of Swift raw fertilizer materials sales, has retired.

J. M. Cosgrove becomes director, development laboratory, Standard Steel Spring Co., Coraopolis, Pa. . . . Louis S. Fryer named production manager, Industrial Rayon. . . . H. R. MacMillan elected director, International Nickel, Canada. . . . Charles T. Ballantyne named secretary-general, Anglo-French Purchasing Board, succeeding G. Miller Hyde, resigned.

COAL TAR CHEMICALS

Spot Toluol Is Still Unobtainable

Pfizer Starts Production of Technical Grade Fumaric Acid Under New, Cheaper Process—Benzol Production Curtailed—Oil Recovery Down—Railroad Buying of Creosote Anticipated

DEMAND for coal tars last month continued on conservative scale. Yet prices on toluol continued to be nominal. No spot material is available at any price, though backlogs of producers have been scaled down somewhat from peak. Nitration grades are in heavy demand for export, but inquiries meet with slight interest.

Notable development was entry of Chas. Pfizer & Co., Inc., N. Y. City, into fumaric acid production. Company will offer technical grade, manufactured by new process, considerably under old price level.

Production trend of benzol, tar and light oil recovery, followed easy market. Slowing down of blast furnace operations, curtailing coke operations for first time in seven months, was responsible. Bureau of Mines reports decline of 2.5% from December, with by-product coke production at 4,707,068 tons, off 0.2% from December. Coke was made at 84 plants of which 80 made ammonia, 56 benzol. Stocks of by-product coke at both furnace and merchant plants were lowered 22%, with supply at current rate of operations sufficient for 13.2 days.

Tar Oil Recovery

Estimated tar oil recovery in January was 56,688,489 gallons, against 57,708,726 gallons in December. Light oil output was closer to December with 19,029,882 gallons in January against 19,069,413 gallons. January benzol production totaled 11,424,000 gallons against 11,536,000 gallons; ammonia liquor 4,807,000 pounds in January, 4,897,000 in December. All figures, however, are well over same month a year ago.

Creosote oil producers still await heavy purchasing by railroads, utilities expected to materialize last month. Cresylic business trend is down, but lack of import material enables item to maintain firm tone. Shipments of pyridin against contracts absorbs available supply. Benzol, xylol were not so tight, and some spot material on intermediates became available during period under review.

New Coal Tar Colors

Food and Drug Administration holds public hearing March 11 on a proposal to add two new coal-tar colors "D. and C. green No. 8" and "D. & C. red No. 39" to acceptable list for certification under Food and Drug Law.

Important Price Changes

	Feb. 29	Jan. 31
ADVANCED		
None		
DECLINED		
Acid fumaric	$0.24	$0.75

Associations

Dr. Donald Price, chief research chemist, National Oil Products, named first president, Chemists' Alumni Assn. of Columbia University, N. Y. City. Dr. Harry L. Fisher, associate research director, U. S. Industrial Alcohol, is vice-president; Wendel G. Fogg, chief chemist, Air Reduction, secretary-treasurer.

R. K. Turner, Carbide, elected chairman of newly organized Chemical Engineers' Club, Charleston, W. Va. W. T. Nichols, Westvaco, named vice-chairman and J. R. Williams, Du Pont, secretary-treasurer. Only A. I. C. E. members are eligible to join new group.

U. S. Shellac Importers' Assn., elects Morris Rosen, Mantrose Corp., president, Herbert Suhr, E. J. Cornelis, vice-president. Board members are: Louis Gillespie, Gillespie-Rogers-Pyatt; P. N. Rowe, P. H. Rowe, Inc.; Adrian E. Jacobs, Dings & Schuester; Arthur F. Lerden, Alfred Kramer & Co.; John R. Anderson, Ralli Brothers. George A. Ashby continues as secretary.

Latest practices, developments in various applications of oxy-acetylene process in American industry, will feature annual convention of International Acetylene Assn., at Hotel Schroeder, Milwaukee, April 10-12.

Sixth annual Conference of Agriculture, Industry and Science, sponsored by National Farm Chemurgic Council will be held March 27-29 at Hotel Stevens, Chicago.

Details of a cash award for outstanding contribution to advancement of chemical analyses in olive oil will be disclosed at Harmony Dinner of The Olive Oil Association of America, Inc., April 4, at New York City's Hotel Astor.

Director F. J. Sievers of Massachusetts Experiment Station acts as chairman, Southern New England Conference, National Fertilizer Association at Lord Jeffrey Hotel, Amherst.

Hercules Plant Operating

Hercules Powder new ammonia plant at Pinole, Cal., now in operation.

Strands of Tenite, acetate butyrate plastic, developed by Tennessee Eastman Corp., are now being extrusion molded in continuous lengths and woven like reed or rattan for lawn settees, chairs, tables. Resilience of product gives slight springiness to chair seats; smooth surface prevents tearing of sheer frocks, hosiery. Weather won't harm it, company says.

FINE CHEMICALS

Italian Decree Prohibits Quicksilver Exports

Mercurials Prices Soar In Anticipation of New Domestic Rise—Tartar Products Move Well—Seasonal Items In Demand—Most Buyers Are Cautious—Japanese Menthol Price Drops

ITALIAN decree prohibiting quicksilver exports for duration of war highlighted last month's news in fine chemicals. Mercurials prices which had lagged inconsistently despite soaring primary market suddenly woke up. Quotations on major derivatives advanced from 15 to 40c a pound.

Situation, acute enough domestically, borrows complexity from heavy European inquiry which developed on heels of Italy's withdrawal. Sellers of U. S. metal settled back to await developments. Offerings became cautious.

Notable among mercurial advances were: corrosive sublimate, up 15c at $2.04; technical yellow and red oxide 40c higher at $2.66 and $2.81 respectively; red precipitate up 40c to $3.06; white up 20c to $2.54.

Balance of market went from good to quiet. Buying holds closely to requirements in most cases. Tartar products moved well on spot material and against contract, maintaining volume of recent months. Japanese menthol gave ground on a price basis, gained ground competitively. Iodides moved well at full prices.

Seasonal Items Strong

Seasonal items, quinine, codeine, guaiacol, creosote, bromides, etc., have not yet run their course. Good demand continued from consumers and distributors. Strychnine aroused buying interest when raw material price rose.

Quinine arsenate advanced 7c to $1.02, with quinine dihydrochloride following lead for 1c to $.78. Others to share uptrend were sulfanilimide, up 5c to $1.70; theobromine, up 30c to $2.40; and acetophenone up 5c to $1.20.

Quinines, however, also appear on the downside, with bisulfate and hydrochlorosulfate both off 1c. Menthol weakened 10c being quoted now at $3.65; agar No. 1, dropped 2c to $1.45.

Important Price Changes

	Feb. 29	Jan. 31
ADVANCED		
Acetophenone	$1.20	$1.15
Quinine arsenate	1.02	.95
Quinine dihydrochloride	.78	.77
Quicksilver	182.00	
Sulfanilimide	1.70	1.65
Theobromine	2.40	2.10
DECLINED		
Agar, No. 1	$1.45	$1.47
Menthol	3.65	3.75
Quinine bisulfate	.57	.58
Quinine hydrochlorosulfate	.78	.79

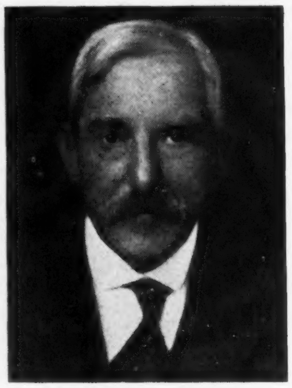
Monsanto Magazine Best

"Monsanto Magazine," house organ of Monsanto Chemical was adjudged best all-round periodical of its type in competition sponsored by House Magazine Institute, N. Y. City, "chamber of commerce" of house magazine editing profession.

Entries were submitted in two groups, those dealing exclusively with internal material and those using external editorial content. Second place in the internal field went to "The Hercules Mixer" magazine of Hercules Powder, while Merck's Report took second place in the external field. Cited for honorable mention was "The Paper Maker" another Hercules magazine.

Obituaries

John Stauffer, organizer and former vice-president, general manager of Stauffer Chemical Company, San Francisco, died of pneumonia, in that city, recently. He was 78 years old. Mr. Stauffer had been ill since 1932 when he retired from active participation in business. For several months past his condition had been acute.



John Stauffer

Mr. Stauffer, the original family member, from which the company took its name, arrived in San Francisco in the early 80's. Training of several years in Solvay European sales department enabled him to visualize a bright future in the undeveloped chemical territory on the West Coast.

Early alkali experience in Europe led him naturally into production of sal soda. But when simplicity of manufacture became known, others rushed into the field, developing a highly competitive situation. Mr. Stauffer branched out into other lines as soon as funds became available. One of his earliest "chemical scoops" was production of whiting from English cliffstone.

Other Deaths of Month

Theodore M. Hopke, 82, retired chief chemist, National Tube Co., died in McKeesport, Pa. . . . George S. Spettigue, 60, former North Atlantic district manager, Sherwin-Williams, died in Summit, N. J.

Joseph A. Mangin, 42, former vice-president, United Color & Pigment Corp., died at his Maplewood, N. J., home. . . . W. H. Wright, 61, vice-president, Semet-Solvay Engineering Corp., died at Mountain Lakes, N. J. . . . Philip A. Andrews, 45, vice-president, Johns-Manville Sales Corp., was killed when struck by a train at New Rochelle, N. Y. . . . Florence M. Dolan, secretary to Louis Neuberg, vice-president, Warner Chemical, died suddenly in Woodlawn Sanitarium, N. Y. . . . Sir Gilbert Morgan, former chemical research director, British Department of Scientific and Industrial Research, died in Richmond, England, hospital.

Dr. William Conger Morgan, 65, chairman, chemistry department, University of California, died in Los Angeles. . . . Henry M. Mathiesen, 56, general manager, Duncan Higgins & Co., chemical importers, exporters, died in New York.

John J. Fasmer, 56, general sales manager, Stephens-Adamson Mfg. Co., Aurora, Ill., died suddenly . . . Edward C. Brock, 66, president, Standard Chemical, Houston, is dead . . . Lionel Brown, head chemist, Noblesville Milling Co., died in Chicago following appendectomy.

Chemical Section Dinner

Reservations for banquet of Drug Chemical and Allied Trades Section, N. Y. Board of Trade were running well ahead of '39 when 1,600 attended, according to Ralph E. Dorland, Dow Chemical, chairman, declared just prior to the event. Senator Gerald P. Nye will speak on "War and Foreign Trade."

Teal, Naugatuck Build

Teal Chemical Company is building plant at Tarant City, Ala., for production of calcium carbide by electric furnace process.

Naugatuck Chemical breaks ground for $500,000 building at Naugatuck, Conn.

Lift Phenolic Resin Ban

Presidential order barring import of synthetic phenolic resin, Form C, because of patent infringement, was lifted under Treasury Department edict, as patent has now expired.

Prepared Monthly by U. S. Industrial Chemicals, Inc.

USI **SOLVENT NEWS** Reg. U.S. Pat. Off. USI

March ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1940

U. S. I. Develops New Solvent for Window Cleaning Compounds

Can be Diluted with Water to Make Finished Liquid Cleaner

Meeting the growing demand for a solvent suitable for use in the manufacture of window cleaning compounds, U.S.I. has developed a new concentrated solvent blend that can be diluted with water to make a finished liquid cleaner.

In placing this solvent on the market, U.S.I. has made it possible for manufacturers of cleaners to offer a highly effective product.

Window cleaning compounds can be made from U.S.I.'s new solvent simply by diluting with water.

All that is needed to manufacture the finished compound is to dilute the new solvent with water. The final compound may contain

(Continued on next page)

The fire-hazard properties of about 200 flammable liquids, solids, and gases are concisely summarized in a new table, which lists flash points, ignition temperatures, and explosive limits in air. Copies of the table may be obtained by writing U.S.I. Ask for Bulletin FH.

Makes Pigmented Bases With Cellulose Ether

EASTON, Pa.—Better dispersion of pigments in a cellulose ether medium, for use in the manufacture of paints, varnishes, lacquers, enamels, inks, and plastics, is the aim of two patents issued to an inventor here.

Stable pigmented cellulose ether bases can be prepared, it is claimed, by incorporating the pigment in the cellulose ether in the presence of a metallic salt. The dispersing medium, which may be wholly or chiefly cellulose ether, is coalesced with a plasticizer, such as dibutyl phthalate, a pigment, and a metallic salt. The coalesced mass is then subjected to high shearing stresses.

A typical base, according to the patents, has the following proportions:

	Parts by weight
Ethyl Cellulose	100
Carbon Black	50
Dibutyl Phthalate	10
Calcium Palmitate	5
Xylene	39

Other pigments, such as Prussian Blue, Chrome Green, or Maroon Lake, may be used in appropriate proportions in place of carbon black, it is said.

Dibutyl Phthalate is produced by U.S.I.

Solvents Play Important Role in Manufacture of Artificial Leather

Fast-Growing Industry Consumes Increasingly Large Amounts Of Three U.S.I. Products, S. D. Alcohol, Solox and Ethyl Acetate

Rapid expansion of the artificial leather industry in the last few years has created a new market of major importance for three U.S.I. solvents, Solox, S. D. Alcohol and Ethyl Acetate. At the present time, the supply of natural leather can meet only a fraction of the needs of the automobile industry alone. As a result, artificial leather has assumed great prominence for the manufacture of automobile seats and tops, shoes, bookbindings, furniture covering, and many other applications. The industry consumes millions of gallons of S. D. Alcohol every year.

Essentially, artificial leather is a woven fabric base coated with nitrocellulose containing castor oil as a plasticizer and pigments to impart color and covering power.

Solvents Used In Coating

Basic step in changing the fabric into artificial leather is the application of the nitrocellulose coating. In preparing the coating, it is necessary to dissolve the nitrocellulose in organic solvents. A very heavy-bodied solution is normally employed, to make the coating as thick as possible with the fewest operations.

The liquid used to dissolve the nitrocellulose is usually a mixture of three solvents: an *active* solvent, such as ethyl acetate; a *latent* solvent, such as denatured alcohol; and a *diluent* or extender, such as benzol, toluol, or petroleum spirit. Relative proportions of the three solvents vary somewhat, depending on the source of the nitrocellulose used, which may be ordinary nitrocellulose, recovered

(Continued on next page)

Makes Nitrocellulose Safer, Improves Films

ARDROSSAN, Scotland—How nitrocellulose film and coatings can be rendered less inflammable is revealed in a U. S. patent issued to an inventor here.

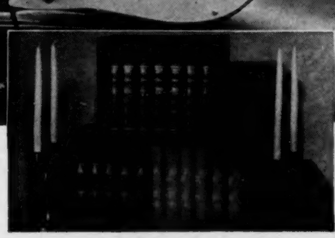
Inclusion of a salt of dimethyl phosphoric acid in a gelatinized nitrocellulose composition is said to have the effect of reducing the inflammability characteristics of the film or coating that remains after the volatile constituents have evaporated.

Certain of the salts of dimethyl phosphoric acid—for example, those of ammonium, cadmium, and cerium—are also said to have the effect of increasing the transparency and flexibility of the film.

It is said that these salts do not result in an undesirable odor.

U.S.I. Establishes Safety Record

BALTIMORE, Md.—The best safety record ever established by the Curtis Bay Plant occurred during the period from January 1 to October 30, 1939. Within this interval of time, the plant operated for a total of 446,470 man-hours without one single disabling injury.



Automobile upholstery, luggage, shoes, and bookbinding are a few of the applications for artificial leather. S. D. Alcohol and Ethyl Acetate are solvents which play an important part in the coatings used in the manufacture of artificial leather from cloth.

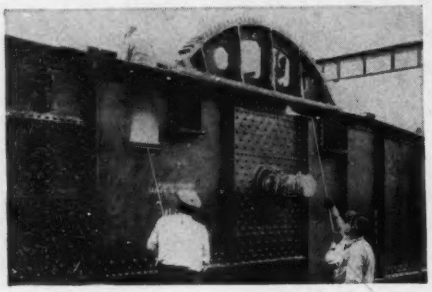
ADVERTISEMENT—*This entire page is a paid advertisement.*

SOLVENT NEWS

Flame Cleaning Process Lengthens Paint Life

More lasting paint jobs on steel and structural work are promised by a flame-cleaning and dehydrating process developed by Air Reduction Sales Company.

Several advantages are claimed for the process. It drives out occluded moisture from



beneath the scale and on the surface of the steel. It heats the steel sufficiently to expand or explode semi-tenacious scale. Hand wire-brushing will remove partly loosened scale and powder. Painting while the steel is still warm provides a superior paint base.

Further information on this process may be obtained by writing U.S.I.

Window Cleaning Solvent

(Continued from previous page)

from 15 to 50% by volume of the solvent, as desired. Even the 15% mixture is safe for storage in cold weather.

The 50% dilution, it should be noted, will affect paint, varnish, and lacquer, and will soften celluloid (such as eye-glass frames). The 15% compound, however, may be used safely on such surfaces and is an excellent polish for eye-glasses.

Contains Rust Inhibitor

A special feature of this new U.S.I. solvent is its rust inhibitor, which will prevent rusting and corrosion of metal containers and atomizers. In the addition of the rust inhibitor, U.S.I. applies to this new solvent its wide experience with inhibitors in the field of anti-freeze compounds.

As a further convenience, U.S.I. manufactures this solvent with the tint furnished, obviating the necessity of adding colors separately.

Further information can be obtained by writing U.S.I.

Coats Photographic Films For Greater Flexibility

PARLIN, N. J.—Flexibility of photographic films can be improved and life increased by coating at least one surface, according to a patent issued to an inventor here. A suggested coating solution is made by adding a resin to a solution comprising ethyl alcohol, water, and dioxane. To this is added a solution consisting of benzol, butyl alcohol, and butyl lactate.

Ethyl Alcohol and Butyl Alcohol are produced by U.S.I.

Solvents in Artificial Leather

(Continued from previous page)

photographic film scrap, or smokeless powder unfit for ballistic purposes.

The castor oil and pigments, in the form of oil-ground colors, are added to the nitrocellulose solution. Sometimes, where extra brilliancy is desired, dyes are dissolved in alcohol and then incorporated. The coating is applied to the cloth under a "doctor" blade which spreads the coating evenly. The fabric is then dried by heat, and the process repeated until the coating reaches the desired thickness.

Artificial leather finds so many different uses that it is desirable to vary color and finish, depending on the applications. Pigmentation of the coating controls the color, and the finish can be varied by an embossing process. Embossing makes it possible to print patterns or "grains" on the coated surface, and the product can be made to resemble real leather very closely. Even reptile skins can be simulated. The embossed leather is pressed at a high temperature, so that it will permanently retain the impression.

Solox is a proprietary solvent of U.S.I., which also produces S. D. Alcohol and Ethyl Acetate.

Valve Shuts off Liquid When Container is Full

TOPEKA, Kans.—Fast, automatic filling of barrels, drums, or cans is claimed for a new shut-off valve that is said to stop the flow of liquid when the container is full.

Valve is reported to be adaptable for use with paint, oils, chemicals—even asphalts.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A protective cream is said to be useful in the protection of hands and other exposed skin against industrial dermatitis. Maker reports that it is being used in the paint, varnish, lacquer, petroleum, and chemical industries. The cream is insoluble in water except when soap is used, it is claimed. **(No. 310)**

U S I

A liquid cleaner removes dirt, grease, carbon, and gum and loosens paint and lacquer, according to the manufacturer. Cleaner is used cold, it is said, and the parts are immersed in it and then rinsed. Other advantages claimed are that foreign matter is precipitated and that the cleaner is fire-safe, non-toxic, and non-corrosive. **(No. 311)**

U S I

Resin pastes are described as suitable for tinting paints, varnish enamels, and petroleum naphtha soluble alkyd resins. They are available in several pigments, and are said to offer increased tinting strength and easy mixing. **(No. 312)**

U S I

A new filter is reported to offer low filtration costs for a wide range of liquids, including water, solvents, cleaning compounds, fuel oils, and many others. It is said to consist of a shell, base plate, and cover, with removable filter tubes made of cotton yarn wound on screen cores. **(No. 313)**

U S I

Heat-resisting coatings give protection over a range from ordinary temperatures up to 1,800 degrees F., it is claimed. It is also said that the coatings remain elastic, expanding and contracting with the metal, and that they have high resistance to rain and snow and are not affected by the fumes of sulphur dioxide, carbon dioxide, acetic acid, or chlorine, even in the presence of moisture. **(No. 314)**

U S I

A wood sealer, available in pigmented form, is said to prime and seal bare wood in a single coat. Manufacturer claims that it will effectively seal oily and pitchy woods against bleeding into the finish coat. **(No. 315)**

U S I

A paste solder is said to result in substantial savings in soldering time. According to the maker, it is self-cleaning and self-fluxing. It is applied by brush, and melts at a temperature slightly above 400 degrees F., it is said. **(No. 316)**

U S I

Rubber gloves are now molded by the anode process on a form that is shaped to duplicate a wearer's hand and arm, it is reported. The gloves are said to be flexible, fit closely, resist tearing and have excellent electrical resistance, wet or dry. **(No. 317)**

U S I

A first aid material for application on burns is said to be available in the form of a water-soluble jelly containing a proportion of tannic acid. It is reported to be proof against freezing down to 20 degrees below zero. **(No. 318)**

U S I

A new odor adsorber is said to be completely self-contained. According to the manufacturer, it consists of an activated carbon adsorber unit and fan mounted in a single "package," which can be "plugged in" at any convenient location. **(No. 319)**

SOLVENTS

Export Demand For Spot Acetone Ignored

Heavy Shipments Against Domestic Contracts Takes Available Quantities—Lacquer Diluent Price Reduction Arouses Buying Interest—Rubber Solvent in Demand—Alcohol Production Up

UNSATISFIED demand for spot acetone, butyl alcohol featured otherwise commonplace solvents market last month. Material on both items is practically unobtainable, with export buyers thicker than trees in Yosemite. Good shipments against domestic contracts leave nothing on which sellers might reap attractive foreign prices.

Recent reduction in lacquer diluent aroused some interest in early two weeks, with slight pickup in inquiry noticeable. Reported concessions on almost all solvent and diluent material in Mid-west failed to be reflected in East where prices held well.

Rubber solvent was taken in nice quantities by rubber manufacturers at 9½c. Producers look for this item to retain its firm position yet a while. Auto manufacturing upturn will help lacquer group which lacks buyer appeal at present. Little interest was shown in cleaners' naphtha at 9-10½c a gallon. Paint trade showed more interest in V. M. & P. naphthas as month played out.

Ethyl Alcohol Production Rises

Ethyl alcohol produced during January 1940 amounted to 20,655,547 proof gallons against 17,067,004 gallons for January 1939. Alcohol withdrawn for denaturation was 18,386,057 gallons as against 11,401,032 gallons in January 1939. At the end of the month stocks in bonded warehouses were 15,278,910 gallons contrasted with 24,433,496 in January 1939.

Production of completely denatured alcohol was 1,303,991 in January '40 and 474,140 in '39.

Methanol Production Up

Production of synthetic methanol during January 1940 was 3,452,677 gallons as against 2,462,884 gallons in 1939. Production of crude methanol totaled 457,271 gallons in January 1940 and 351,-814 in the same period last year.

Total production of synthetic methanol for the year 1939 was 34,255,699 gallons, an increase of 31.5% over the 26,031,169 produced in 1938. The production of crude increased 11.7% from 4,170,096 in 1938 to 4,659,589 gallons in 1939.

Wishnick-Tumpeer Expands

Wishnick-Tumpeer, Inc., continues expansion program with new southwestern branch office in Dallas National Bank Bldg., Dallas, Tex. Office will service, offer technical assistance to users of industrial chemicals sold under "Witco" and "Pioneer" brand names.

Important Price Changes

ADVANCED	Feb. 29	Jan. 31
None		
DECLINED		
None		

A.I.Ch.E. Moves Office

On April 1, 1940, the office of the Secretary of the American Institute of Chemical Engineers, will be moved to the Chemists' Building, 50 East 41st Street, New York City. The very rapid growth in membership of the American Institute of Chemical Engineers from about 1,500 to 2,400 during the last three years, has rendered the quarters in the Engineering Society Building inadequate.

Recently published statistics show that 12,500 young men are registered in engineering schools for chemical engineering training. About 2,500 of these are graduated each year. There is an increasing demand for men trained in chemical engineering, which will tend to broaden the activities of the Institute.

All of the publication and sales activities connected with the transactions of the American Institute of Chemical Engineers will be held at the new location.

The Chemists' Club is located in the same building. The meetings of the directors in New York are held there, as well as meetings of the Committee on Admission, and luncheon meetings of other committees, thus bringing about greater centralization of chemical and chemical engineering activities.

Construction

U. S. Rubber will begin immediate construction of a tire and footwear plant in Buenos Aires, Argentine, with production scheduled to begin October 1. Chauncey Garland, executive at Naugatuck footwear plant, will head footwear division in South America; George Seiberling, Detroit tire factory executive, will handle tires.

Koppers Company, Engineering and Construction Division, awarded contract for 142 Koppers-Becker underjet coke ovens for Carnegie-Illinois Steel Gary (Ind.) plant.

Flintkote directorate approves plans for $2,000,000 plant in Meridian, (Miss.), wood fiber decorative, structural insulation, and wall board products.

General Electric announces plan for plastics division building at Pittsfield (Mass.) covering 9,000 square feet.

Calco now completing addition to Bound Brook powerhouse affording plant one of highest power production ratios in U. S.

National Carbon awards contract for $60,000 laboratory, office addition to Fostoria (Ohio) plant.

Great Lakes Carbon Corp., buys 10 acres at Wilmington, Cal., for construction of $500,000 plant.

Forms Export Company

Simmons Export Company, 1350 Broadway, N. Y. City, organized by A. L. Simmons, president of Simmons Tours.

Two new chemical specialties currently being featured at Kress' New York Fifth Avenue store.

RAW MATERIALS

Soybean Scarcity Reported In Midwest

Soybean Oil Up Fractionally—Certain Sellers Withdraw From Market—Independent Chinawood Shipments May Be Banned—Oticica Is Strong—Perilla Scarce—Sumac Advances Again

REPORTED scarcity of soybeans developing at month's end made tightness in oil situation virtually unanimous. Soybean futures turned sharply upward; oil was up fractionally with many bids at higher levels going unsatisfied. One major crusher withdrew from the market entirely. Others trimmed offerings until something definite is heard from Central Illinois farmers. Feeling is that there just aren't enough beans to go around.

Chinawood was in only light demand but a 26c price couldn't be whittled. Latest advices are that independent oil shipments may be prohibited, and cabled prices ran higher. Tokio is taking only 10,000 metric tons out of Manchukuo this year against 55,000 tons in '39, according to consular reports.

Important Price Changes

ADVANCED

	Feb. 29	Jan. 31
Corn starch, pearl	$2.60	$2.50
Corn sugar	3.09	2.99
syrup 42°	3.12	3.02
syrup 43°	3.17	3.07
Dextrin, British Gum	3.75	3.65
Corn Canary	3.50	3.40
White	3.45	3.35
Oil Corn, crude, tks.	.06¼	.06⅛
Perilla, tks.	.20	.19
Sardine, crude, tks.	.39	.37
Soybean, crude, tks.	.06¼	.06
Shellac, Garnet	.22	.19
Sumac, grd.	100.00	98.00
leaf	100.00	98.00
Waxes, Carnauba, No. 3 N. C.	.51	.46
Japan	.15½	.16

DECLINED

	Feb. 29	Jan. 31
Albumen, egg, dom.	$0.56	$0.60
Egg yolk, dom.	.57	.60
Mangrove bark	32.50	35.00
Myrobalans, J1	30.00	32.00
Oil coconut, crude, tks.	.03⅛	.03¼
Shellac, superfine	.17½	.18
T. N.	.16½	.17

Oticica Shows Strength

Oticica showed strength on limited supply. Perilla was hard to get; no offerings on spot for arrival. Corn crude was quoted ⅛c higher by some sellers, with large quantities difficult to find.

Drying oil import statistics for past two years show perilla, oticica moving in opposition to tung. Tung figures show 107,455,674 lbs. entering in '38, slumping to 78,717,634 last year. Perilla '38 volume was 31,820,759 lbs. moving up to 51,284,120 and oticica imports tripling, 5,300,899 in '38, against 18,866,689 last year.

Sumac, after $15 advance in January, ran up $2 closing month at $100. Carnauba maintained its upward trend, N. C. 3, adding 5c to wipe out January's decline. Candelilla met buying support in sufficient quantities to hold market steady. Japan prices advanced ½c, to a basis of 16c, due to relative scarcity of local stocks. Myrobalans remained soft.

Several of the copals in the varnish group were reduced drastically during February. Demand has not been as heavy as in the past few months and stocks in consumers' hands are larger than they were 60 or 90 days ago. Further, shipments from foreign primary sources are coming in with greater degree of regularity. With the heavy Spring paint season about to open importers confidently anticipate an increased demand shortly.

Abnormally cold weather in South prevented free movement of rosin, turpentine from inland producing centers to markets. Gum rosins went for days without offers in both Jacksonville and Savannah. Prices ran up. Turpentine, however, which came into period under review on a rise reached crest before mid-month, slid back from 35 to 32½c at Savannah. Jacksonville closed month at 34¾c. All offerings during closing week found buyers.

CCC holdings of Feb. 26 of rosin and turpentine were released as follows:

	Rosin 1938	Rosin 1939	*Turpentine 1939
Savannah, bbls.	103,707	50,235	......
drums	60	6,490	......
Jacksonville, bbls.	176,708	114,301	1,237,190
drums	......	14,998	......
Brunswick, bbls.	92,871	86.303	1,046,260
drums	854	3,411	......
Mobile, bbls.	13,607	7,100	......
drums	698	7,442	......
Pensacola, bbls.	25,466	18,014	......
drums	72	4,204	...
Valdosta, bbls.	121,592	132,706	1,393,355
drums	22	30,864	......
Wiggins, bbls.	......	282	......
drums	......	8,344	......
Estill. bbls.	......	696	......
drums	......	7,445	......
Helena, bbls.	......	53,497	1,110,180
drums	......	52,768	......

* Gallons.

Bradshaw Gets Medal

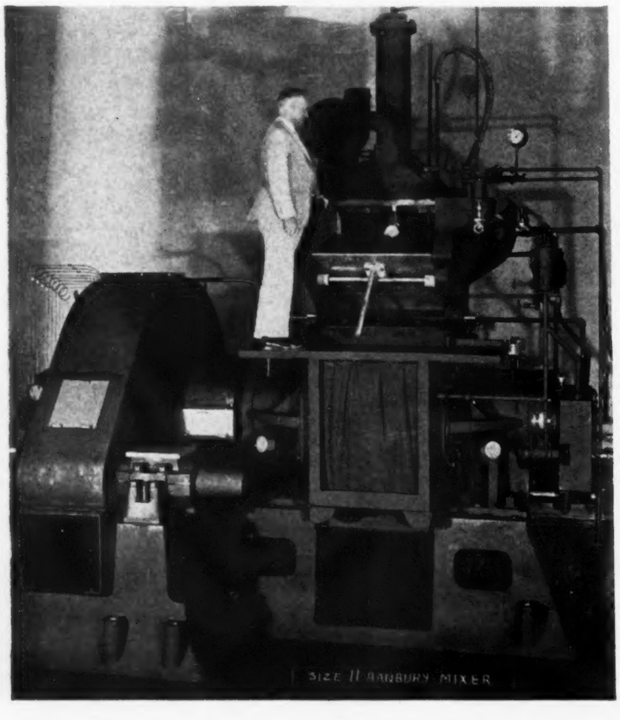
William Henry Bradshaw, Du Pont rayon department, will receive '40 Jacob Schoellkopf Medal of Western N. Y. section, A. C. S. for research development leading to commercial production of "Cordura." Award will be presented at May meeting when Mr. Bradshaw addresses section.

'Priorites' X-ray Article

Discovery and use of X-rays is theme of leading article in March issue of *Priorities,* house magazine of Prior Chemical. In addition to medical applications, story cites many ways X-rays are employed in industry, agriculture, and other lines of endeavor.

Davies-Young Sales Group

Davies-Young assembled sales, research force at Dayton, Ohio, for question and answer session, consisting of answers to queries submitted by salesmen several weeks before meeting. Theme was "Synchronized dry cleaning."



F. H. Banbury, Farrel-Birmingham Company, Ansonia, Conn., received Modern Pioneer Scroll of Achievement for invention of Banbury Mixer, which revolutionized mixing, compounding of rubber and plastic materials. He is shown here with mixer.

PIGMENTS AND FILLERS

Titanium Business Well Ahead of 1939

Spring Buying of Paint, Coating Consumers Not Yet Evident—Lead Derivatives Sluggish—Carbon Black Sales Strong—Paint Sales Rise—Casein Drops Again—Driers Demand Slackens

SPRING buying failed to come into last month's picture on pigments. Titanium volume was a surprise, however, with best month coming up. Business ran ahead of same month last year in same ratio as '39 scored over '38. Price was shaved in January, but while early, there is nothing freakish about current high volume, most factors feel.

Lead derivatives failed to get going despite good demand for metal. Prices of lead pigments were reduced ¼c early in the month when the metal quotation slumped but full recovery was scored later when pig lead prices turned higher again. Zinc oxides held former level despite rise in slab zinc. Long, hard winter is seen keeping paint market lethargic, with upturn reliably estimated still 15 days away.

Carbon black sales remained strong. Volume in short month maintained January pace, sales running slightly under production. Rubber industry called for

Important Price Changes

ADVANCED	Feb. 29	Jan. 31
None		
DECLINED		
Casein, 20-30 mesh	$0.10½	$0.13
80-100 mesh	.11	.13½

good shipments, and auto industry upturn is looked upon as favorable factor in the offing. No revision in prices is looked for covering second quarter deliveries despite the very low price ranges now in effect. Glues, blanc fixe, quicksilver vermillion were other strong spots.

Producers of driers found demand slackening. Prices of palmitates, stearates were revised upward in January, and material may look uninviting to buyers at first glance.

Casein market is still glutted by huge stores in Argentina. Scarce New Zealand casein was quoted slightly higher on purely nominal basis. Few buyers showed the slightest interest. Price generally was off 1½c but inside opinion is that prices can be shaded at will.

During January 1940 total sales of paint, varnish, lacquers, and fillers as reported by 680 establishments were $28,666,635 compared with December 1939 sales of $26,810,005 and January 1939 sales of $25,166,042.

Company News

The Whitlock Coil Pipe Company changes its name to The Whitlock Manufacturing Co., with management, character of this organization remaining unchanged. Move was made as expanding operations outgrew specific description in old title.

Afta Solvents Corp., N. Y. City, leases second floor of building at 470-484 W. 128 st., formerly occupied by Borden, to afford room for expanding activities of chlorine derivative department.

R. T. Vanderbilt Laboratories, South Norwalk, Conn., plan a $40,000 addition to a plant to expand research work on rubber, paint, paper, ceramic products.

Krebs Pigment & Color Corp., completes ten-year research program on paints, pigments, including laboratory and exposure tests. Study indicates that white exterior paints of exceptional cleanliness plus good durability can be made from titanium pigments.

AGRICULTURAL CHEMICALS

Winter Storms Still Retard Market

Some Larger Shipments Against Contracts Cheer Producers—Brazil Bans Bone Exports—England Re-iterates Refusal to Buy U. S. Tobacco—Sulfate of Ammonia In Heavy Export Demand

FIRST bright spot to show in agricultural chemical market since December appeared as last month was going out. Only larger deliveries against contracts, yet, producers found cheer in it.

Before month was half over, there was talk of a late season. Snow in South, floods in California, and wintry blanket over Northeast contributed to gloomy outlook.

Bone producers may get lift from Brazilian decree prohibiting animal bone exports for any purpose. Edict met loud howls from Brazilian meat packers who will be forced to sell far below U. S. prices in their own country.

England Confirms Stand

Another note from abroad finds England making definite its decision, reported here last month, to stop buying American tobacco. Question was asked in House of Commons as to why dollar resources were being used to purchase tobacco here. Sir Andrew Rae Duncan, Board of Trade president, declared no dollars were being so spent; that Dominions and Turkey were supplying Britain's full requirements and would continue to do so.

Sulfate of ammonia was in heavy export demand at $28 a ton in bulk. Supplies tended to dwindle toward month's end, with scarcity for shipment to certain ports. Movement against contracts remained sluggish.

Again, more prices appear on the downside than otherwise, with majority of items attracting little attention from buyers. Tankage, nitrogenous material, blood, and hoof meal all slipped, although high grade ground blood recovered 15c of its slump before month played out.

Tax Tag Sales Up

Total tax tag sales in February in 17 States, according to reports by control officials to the National Fertilizer Association, amounted to 717,752 equivalent tons. This represented a gain of 4.8% over February 1939 but tonnage was somewhat below the corresponding month of 1938 and 1937. Sales this year have been 3.6% larger than a year ago.

Piedmont Company Formed

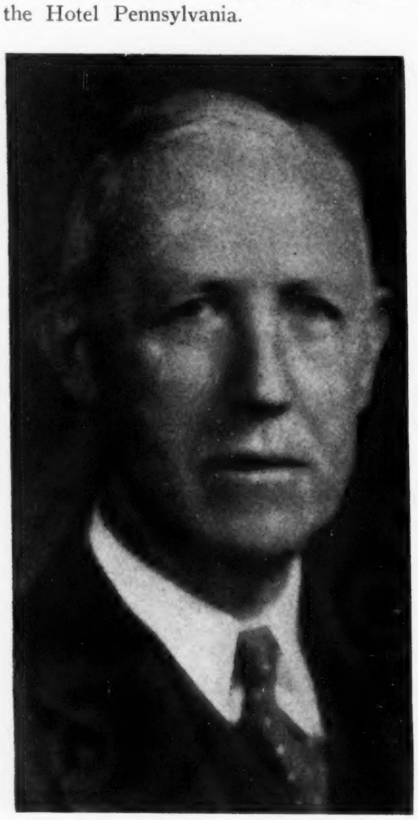
Piedmont Fertilizer Company, Charlotte, N. C., organized by J. Thurton Kiser on semi-cooperative plan with large dealers in the area as stockholders. Plant went into production March 1.

Important Price Changes

	Feb. 29	Jan. 31
ADVANCED		
Jap sardine meal	$52.00	$51.00
DECLINED		
Blood, dried, dom.	$3.10	$3.35
high grade, Chgo.	3.25	3.50
imported	3.20	3.30
Hoof meal	2.50	3.00
Nitrogenous mat., dom.	1.95	2.00
East Coast	2.50	2.90
imported	2.45	2.60
Tankage, grd.	3.10	3.25
ungrd.	3.10	3.25
imported	3.35	3.50

Nelson Gets Nichols Medal

For outstanding contributions in the field of enzyme chemistry, Professor John M. Nelson of Columbia University received the 1940 William H. Nichols Gold Medal of the New York Section of the American Chemical Society at a joint dinner of the Section and the Society of Chemical Industry last (Friday) night at the Hotel Pennsylvania.



Columbia's John M. Nelson

More than 300 scientists of the metropolitan area united in honoring Professor Nelson, who, it was declared, has done "classical work in the kinetics of enzyme reactions, the purification of the enzyme invertase, and the purification and isolation of the enzyme tyrosinase".

Dr. D. P. Morgan, member of the jury of award, presented the medal, one of the highest honors in chemical science, to Dr. Nelson, who delivered the annual medal address on "Some Plant Oxidases". The medalist and his scientific work were described in introductory speeches by Professor Marston Taylor Bogert of Columbia University, under whom Professor Nelson wrote his doctor's dissertation thirty-three years ago, and Dr. John H. Northrop of the Rockefeller Institute for Medical Research, Princeton, N. J., who carried on his Ph.D. studies under Professor Nelson in 1914 and 1915. Professor Louis P. Hammett of Coulmbia University, chairman of the Section, presided.

Personals

Dr. Jacque C. Morrell, associate research director, Universal Oil Products addressed N. Y. Chapter, A. I. C., at N. Y. City's Chemists' Club, on "The Chemist in the Petroleum Industry."

Dr. W. L. Badger of Dow's consulting engineering division, discussed engineering equipment used in 16th, 17th centuries before East Tennessee Section A. C. S., in Knoxville.

Dr. Charles M. A. Stine, Du Pont vice-president in charge of research discussed "Chemistry and Medicine" before the Wilmington Alumni Chapter, Tau Beta Pi fraternity.

Alfred E. Whitford, Baker Chemical, appointed chief burgess of West Easton, Pa.

John Swenhart, Atlas Powder advertising manager, spoke on "Industrial Advertising—A Pike's Peak" at luncheon meeting Wilmington Masonic Club.

J. B. Carlin, Jr., assistant treasurer, Forest Products Chemical, discussed "Workmen's Compensation Insurance" before Memphis chapter, National Association of Cost Accountants, Memphis, Tenn.

F. G. Flocke, development and research division, International Nickel, spoke on "Fabrication of Monel, Nickel and Iconel in Solid and Clad Plate Construction" before Oklahoma City section, American Welding Society.

John Zaring, assistant manager, Davidson Chemical, led round-table discussion at sales staff meeting in Columbus, Ohio.

William J. Reardon, Reardon Color and Chemical Works, offers Cincinnati C. of C. detailed proposal to make that city center of U. S. Chemical industry.

F. L. LaQue, International Nickel research division discussed corrosion testing, test result interpretation of nickel and nickel alloy steel before Midland Chapter, A. C. S., at Midland, Mich.

William L. Brunyate, late counsel of National Oil Products, honored posthumously by resolution passed by directorate permanently inscribing his name on minutes of company's meetings.

Dr. Gustavus J. Esselen, Boston chemical consultant, explained and demonstrated high speed motion pictures as method of studying industrial processes at meeting, Virginia Blue Ridge Section, A. C. S., Roanoke.

Dr. F. J. Myers, Research and Development Laboratories, Resinous Products & Chemical Co., discussed "Recent Developments in Synthetic Resin and Resin Emulsion" before Technical Association of the Pulp and Paper Industry convention.

Operates New Grinding Unit

Foote Mineral Company now operating its new grinding unit and warehouse at Queen st. and Mermaid lane. Production of such items as ebony manganese is expected to be boosted as much as 300%.

Soda Nitrate Discovered

A deposit of sodium nitrate expected to yield a high tonnage of the pure product, according to tests at Bureau of Mines, has been discovered in Arizona, about 20 miles west of Los Angeles. In addition to considerable tonnage of pure sodium nitrate, there are immense quantities of lower grade material, say deposit's discoverers.

Phosphate Company Organized

Maury-Williamson Phosphate Company chartered in Tennessee with capitalization of $250,000 to engage in mining, milling, concentrating, other phases of phosphate industry. Curtis B. Dall, Laurence B. Howard, J. T. Ward, J. F. Eggleston are incorporators. Offices will be in Nashville.

Goodrich In Chile

B. F. Goodrich Corp. has obtained permission to establish a tire manufacturing plant in Chile.

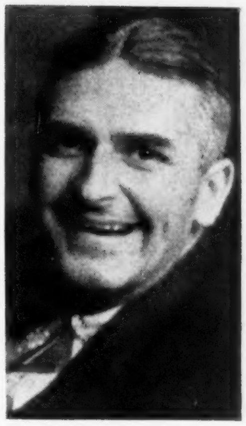
Joseph Starts Brokerage

C. W. Joseph resigns as representative, Columbia Naval Stores, to establish own naval store brokerage. . . .Archie S. Mills, manager Columbia Naval Stores Pensacola office transfers to Savannah, with L. Gonzales succeeding him at Pensacola. . . . Ralph A. O'Reilly appointed manager, dry cleaning division, Detroit Rex Products; H. R. Norgen and D. E. Willard become assistant general sales managers.

Calco Builds Addition

Calco is planning 7,000 square feet addition to its Charlotte, N. C., warehouse.

Shipping and Container FORUM



By Richard W. Lahey

Interstate Commerce Commission Issues Order Amending Regulations For the Transportation of Dangerous Articles, Effective On May 15th

THE Interstate Commerce Commission has issued an order amending certain of the regulations for the transportation of dangerous articles. These changes must be complied with on and after May 15th next, but the shipper has the option of making the changes at any convenient time prior to the effective date. Those changes which are of importance to the chemical industry are:

1 *Paints, varnishes, lacquers, etc.*, may be shipped by express and freight in 5 gallon square metal cans enclosed in fiberboard boxes of new waterproofed construction (new I.C.C. Container Specification 12E). Only one 5 gallon can may be packed in an outside container.

2. *Phosphorous trichloride and phosphorous oxychloride* may now be shipped by freight in nickel drums (new I.C.C. Container Specification 5K). These drums are to be fabricated from 99% pure nickel and they closely follow in gauge and construction the I.C.C. 5A acid drums. Lead lined drums have been used by most producers.

3. *Nitrosyl chloride*, a noninflammable compressed gas, has been added to the list and authorized to be shipped by freight and express in a new specification seamless nickel cylinder (I.C.C. Container Specification 3BN). These cylinders are to be fabricated from 99% pure nickel, not to be over 125 pounds water capacity and must stand a service pressure of at least 150 pounds per square inch.

4. *Diphenylaminechlorarsine*, a Class C poison, may be shipped by freight and express in I.C.C. Specification 5A, 5, 5B, 6A, 6B and 6C metal drums only. These drums are all heavy gauge steel returnable containers.

5. A change in Specification 1A authorizes the use of material other than ¼ inch asbestos rope gaskets *for sealing carboys* providing the materials are resilient and as efficient as the asbestos gaskets. This does not authorize the use of gaskets cut from asbestos board.

6. *The construction of fiber drums Specification* 21A *authorized for shipment of certain Class B poisonous solids, and certain inflammable solids and oxidizing materials* has been modified to allow the use of a new method for attaching the fiber heads and bottoms. Fiber discs forming the tops and bottoms may be attached with adhesives provided drums are fabricated by interleaving discs of like material and thickness with the inwardly flanged portion of the shell. A disc is inserted for each lamination of the shell.

7. *Arsenical insecticide and fungicide dusting mixtures* containing 8% or less arsenic trioxide may be shipped in units of 100 pounds packed in I.C.C. Specification 36A or 36B textile bags with inner paper liners. The specification for the 36B bag, containing 2 attached paper liners has been changed to allow the use of 10 ounce burlap instead of 12 ounce material. An additional closure of 2 wire ties has also been authorized by order of the Commission dated Feb. 13, 1939. This latter change removes the principal disadvantage of this container as in regular production it has been found difficult to close by pasting with rubber latex tape over the mouth of the containers.

8. *Specification I.C.C.* 103 *tank cars* are used for shipping certain petroleum products, low pressure inflammable liquids and Class B poisonous liquids. Retests of the tank cars are now set at 10 year intervals instead of 5 year intervals. If repairs are made to the tanks such as extensive caulking or riveting, then tests must be made prior to service and every 10 years thereafter.

A general revision of the Regulations, which includes incorporation of the truck and water regulations as well as many requested changes, is almost completed and will be published soon. It is hoped that date for public hearing will be set for the near future.

Bakelite to Exhibit

Bakelite Corporation, will exhibit extent to which Bakelite plastics, synthetic resinous materials have been adapted to modern packaging requirements at '40 Packaging Show.

BOOKLETS AND CATALOGS

Chemicals

A133. Alframine; Booklet describing Detergent Powder DCA, giving properties and suggested uses. Michel Export Co., Inc.

A134. Bakelite Review; Jan. 1940. Contents—Versatile "Vinylite" Resins, A Designer Looks at Plastics. Plastics Laugh at Corrosion, Be Modern in Packaging to Sell More Merchandise also describes some new materials and products of Bakelite. Bakelite Corp.

A135. Better Crops with Plant Food; Among contents:—Agronomic Problems of the South, Oregon Beets and Celery Need Boron, Potato Fertilization in Michigan, American Potash Institute, Inc.

A136. By Gum; Feb., 1940. Discusses "Elimination of Surface Defects in Alkyl-Urea Enamels," No. 1116 Beckacite, No. 1307 Beckasol and P-138 Beckamine in colored enamels. Also gives data on pebble mill enamels. Reichhold Chemicals, Inc.

A137. Ciba Review; Jan., 1940. Illustrated story of Venetian Silks divided into five topics, namely: Venice between East and West, The Venetian Silk Industry, Silk Fabrics in Venetian Paintings, Venetian Silks, and Historical Gleanings. Ciba Co., Inc.

A138. Ciba Review; Feb., 1940. Well illustrated booklet on "Essentials of Handicrafts and the Craft of Weaving Among Primitive Peoples." Ciba Co., Inc.

A139. Dry Sodium Arsenite; Leaflet describing use as weed killer, termite control, tree killer, grasshopper bait, mormon cricket dust, wood preservative. Chipman Chemical Co.

A140. Durez Molder; Feb., 1940. Company news, Molding of the month, article on "Rural Electrification." Durez Plastics and Chemical Co.

A141. Durez Plastics News; Jan., 1940. Describes and illustrates new products made from plastics. Durez Plastics & Chemicals, Inc.

A142. Florida Land Pebble Phosphate Industry; Location and nature of deposits; methods of prospecting, mining and refining; methods of analysis and testing used by Association of Florida Phosphate Mining Chemists. Association of Florida Phosphate Mining Chemists.

A143. Handbook of Solvent Recovery; Discusses in 28 pages, the factors governing solvent contamination and endeavors to give efficient means for controlling them. Charts, tables and illustrations add to the clarity of the booklet. Darco Co.

A144. Neoprene Notebook; manufacture of products from rubber and Neoprene, stuffing-box packings, oil well packers, Facts about Neoprene for the engineer. E. I. du Pont de Nemours & Co.

A145. Pittsburgh Plate Products; Jan.-Feb., 1940. Contains articles on the use of paint by the railroads in keeping with the streamline trend and helpful hints on paint styling for the home. Pittsburgh Plate Glass Co.

A146. Priorities; Feb., 1940. Short article on products from coal tar. Prior Chemical Co.

A147. Quarterly price list R. & H. chemicals for all industries. E. I. du Pont de Nemours & Co., Inc.

A148. The Clean-Up; Feb. 1940. In this issue, Cleanliness Combats Dermatitis, Athlete's Foot Control, Maintenance of Mastic Floors, Roach Extermination, Modern Cleaning and Window Washing. The C. B. Dolge Co.

A149. The Du Pont Magazine; Feb., 1940. "Lucite" at the fourth annual Modern Plastics Competition, use of "Dulux" on advertising signs, "Rail and Water Tunnels." E. I. du Pont de Nemours & Co., Inc.

A150. The Glass Lining; Illustrated booklet with articles on "White Rabbits from the Chemist's Hat" and "Streamlining Beer Production." Pfaudler Co.

A151. The Houghton Line. Dec.-Jan., '39-'40. Features "Simplified Lubrication" and "After the War—What?" E. F. Houghton & Co.

A152. The Pioneer; Feb., 1940. Brief news of developments in products, processes, and equipment. Electro Bleaching Gas Co. and Niagara Alkali Co.

A153. The New Red Lead; Booklet describing Microlead red lead contains specifications, purchasing information, tests, results of tests, and suggested uses. Micro-Lead Products, Ltd.

Chemical Industries
522 5th Avenue
New York City

I would like to receive the following booklets:

....

....

Name ....

Title ....

Company ....

Address ....

All information requested above must be given

Equipment-Containers

E188. Acme Steelstrap; Folder on the reinforcement of all types of shipping packs, contains 59 sketches showing how various products can be effectively strapped. The most popular of the 429 different Acme Steelstrap tools and accessories are pictured. Acme Steel Co.

E189. Bagology: Variety of anecdotes and humor, also comments on the burlap and cotton markets. Chase Bag Co.

E190. Brad Foote Stock Gears; Catalog illustrating and giving details of gears, reducers, cog belts, sprockets, bearings, pulleys, chains, etc. Also an engineering section in which are given S.A.E. Specifications, Hardness conversion tables, Dimension rules, Table of tooth parts, Weights and sp. gr. of metals, English Standard Measure of Length, Decimal Equivalents, Solution of right angle triangles and trigonometric functions. Brad Foote Gear Works.

E191. Bulletin, descriptive of new water system unit rated at 250 GPH, operated on 20/40 lb. differential, pumping unit and tank are mounted in rubber on steel bedplate. Roots-Connersville Blower Corp.

E192. Bulletins on Air-Operated Controllers, Modern Dairy Control Equipment, Multiple Spline Bristo Socket Screws, and Recording and Indicating Tachometers. The Bristol Co.

E193. Bulletins on Worthington Gas-Engine Compressors, Steam-Jet Ejectors, and Rock Hammers give descriptions, illustrations and specifications. Worthington Pump and Machinery Corp.

E194. Canton booklet of factual description of heavy duty industrial stoker. Canton Stoker Corp.

E195. Chemical Mixers and Feeders; 8 page bulletin describes and illustrates various mixers and feeders for the uniform preparation and feeding of suspensions or solutions in water, sewage and process liquid conditioning and in other applications. International Filter Co.

E196. Chlorextol Transformers; Information on new transformers, for all classes of service, filled with the new non-inflammable insulating liquid, Chlorextol. These transformers are especially suited for installation in locations which would require a fire-proof vault if transformers using oil were used. Allis-Chalmers Manufacturing Co.

E197. Complete directory of engineering literature, bulletins and products issued and produced by Allis-Chalmers Manufacturing Co.

E198. Drilling Line Handbook; Helpful information on handling, care, use and abuse of wire lines in the oil fields. Tables and illustrations of wire lines used for rotary, cable tool, and other operations, also latest American Petroleum Institute specifications. MacWhyte Wire Rope Co.

E199. Electromet Review; Tells of use of stainless steel in decorative elevator doors, blood storage, brewery pilot plant, fruit slicer, and "Wobble-Proof" tables. Electro Metallurgical Co.

E200. Engineering Data and Pumps for the Chemical Industries; Along with the data and illustrations are extracts from Standards of Hydraulic Institute giving the materials of construction for handling various liquids. Buffalo Pumps, Inc.

E201. Electrical Review; March issue of Allis-Chalmers monthly publication features "An Engineer Looks At World War," written by Charles Sturtzen; and "Water, Water Everywhere" an excellent article on the treatment of feed water.

E202. Engraver's Zinc; Metallurgical discussion of zinc photo-engraving plates presented at the Mechanical Conference of the A.N.P.A., June, 1939, by William H. Finkeldey. American Newspaper Publishers' Association.

E203. Facts and Figures; Case studies of benefits which have been secured with modern Triangle package machinery. Triangle Package Machinery Co.

E204. General Information on Bulk Packaging Problems and Materials; 36 page booklet divided into 5 main divisions, namely, Waterproofed Paperlined Materials, Types of Bags, Creped Paper, Barrel and Box Linings, Densometer Device for Testing Moistureproofness, and Suggested Methods for Proper Insertion of Bag, Barrel, Drum and Box Linings. The Paper Service Co.

E205. Handbook on Slings. Latest information on sling designs, capacity and weight comparisons of slings, wire rope and chain; tables for safe working loads; typical assemblies; crane signals; breaking strength and weight comparisons. MacWhyte Wire Rope Co.

E206. Hose Hints; The use of rubber hose in industry, includes description of general construction, fundamental hose terms, chemical solutions that can be conveyed through rubber hose, advice on care, use, and maintenance, dimensions and recommended working pressures, and useful tables. United States Rubber Co.

E207. Kent Super "5"; Description and operation of different types of multiple roller mills.

E208. Kodak; Company news, articles about Lincoln's Gettysburg Address, The Special Instruments Division, Prevention of Plant Accidents.

E209. Link-Belt Conveyors; Copiously illustrated 48 page book showing many different applications of mechanical elevating and conveying equipment for handling both packages and loose bulk materials, also contains several pages of statistics. Link-Belt Co.

E210. Mass-Flo Conveyors; Lists materials and capacities that can be handled at certain speeds, gives typical arrangement diagrams, and illustrates construction and operation. The Jeffrey Manufacturing Co.

E211. Modern Packaging; Streamlining the Bristol-Myers Plant, photographic and diagrammatic description. Falstrom Co.

E212. Morris Stock Pump; Bulletin describing operation and uses of new type pump designed for use on heavy foaming stock in paper mills. Morris Machine Works.

E213. Motor Truck Sales; Brochure containing pictorial illustrations and suggestions concerning motor truck scales and National Bureau of Standards regulations. Toledo Scale Co.

E214. New Heater Catalog; 38 illustrated pages of electric heating units and controls for heating liquids, solids, and air.

E215. Nickel Steel Topics; Contains news items on use of nickel-steel alloys, also describes and illustrates the fundamental application of these alloys to gearing. The International Nickel Co., Inc.

E216. Nickelsworth. Article on New Laboratory of New York's Water Dept., also briefs from the notebooks of the INCO Technical Service Staff. International Nickel Co., Inc.

E217. Oxy-Acetylene Tips; Feb., 1940. In this issue—Instruction Outline for Welding Aluminum Sheet and Plate, Hard-Facing for Farm Equipment. What Oxygen Means to Industry. Linde Air Products.

E218. Phoenix Flame; Jan., 1940. 24 page illustrated booklet contains variety of news and articles on "The Development of Food Containers" and "Character Analysis Through Color." Phoenix Metal Cap Co.

E219. Prater Fibre Grinder; Describes and illustrates mill claimed to give twice capacity per horse power hour in fine grinding of fibrous materials. Prater Pulverizer Co.

E220. Rotex Pumps; Bulletin announcing line of pulseless discharge Rotex pumps with helical gear rotors. Quimby Pump Co., Inc.

E221. Silver-Ply Steel; 24 page booklet of information for buyers and fabricators of stainless equipment. Photographs illustrate typical installations.

E222. Steel Horizons; Large beautifully illustrated booklet announces new steel making process classified as Pluramelt, which it is claimed will open a larger market for fine steels. Also tells of the use of Stainless Steel on the farm, and Stainless Steel Wire Cloth and Screens in industry. Allegheny Ludlum Steel Corp.

E223. Stokes Molding Machines; New Catalog on tube filling, closing and sealing machines.

E224. The Laboratory; Contains short story on Mendeleeff, also some recent developments in laboratory equipment among which are an improved hot wire glass cutter, pyrex watch glasses, small muffle furnace, micro-balance, kit for buffer solutions, multiple burner units, and inexpensive compressed air apparatus. Fisher Scientific Co.

E225. The Needle's Eye; Feb., 1940. Contains articles on New and Improved Machines of 1939, Pennsylvania Sugar Company's way of packing sugar, Plant Modernization Triples Production. American Thread Co.

E226. Tin and Its Uses; Among the subjects discussed are: Speculum Metal, New Thick Tin Lining, Tin for Friction Surfaces, Measuring Thin Coatings, Friction and Seizure Load Tests, Decorated Tinplate, and Developments in the Canning of Fruit Juices. The International Tin Research and Development Council.

New Trade Marks of the Month

V8 MOTOR OIL V-8 OIL CO.
373,654

NE POWER
373,659

NU-WALL
404,834

THERMIDINE ΘΕΡΜΙΔΙΝΗ
411,001

Perma-bond
412,305

Shaverette
414,084

AV
413,974

Kel-liner
415,898

CAMPOS QUEBRACHALES FABRICA de TANINO PUERTO SASTRE MARCA REGISTRADA
419,072

Agfarnol
421,075

Buttarom
421,076

Carnetton
421,077

Citronal
421,078

Neovertin
421,079

Turkol
421,080

Vionaron
421,081

DE-SUL-FLUX
423,003

UVX-4
423,018

SEAL-HIDE
423,024

EXTRAX
423,124

PYRON
423,131

Neo-Lav Cleans most Everything
423,143

"23"
423,189

ES MOTOR OIL
423,256

KUROKROME
423,337

Soot-Eater Heats It and Eats It Before After
423,339

WHITE MONDAY
423,441

GAGG
423,461

4 Star
423,488

CRYST-O-KLEER
423,569

Foodcraft
423,580

JUNO SUDS
423,690

CURTYL
423,727

STAINEZE
423,489

SALPRESCO
423,739

Trade Mark Descriptions†

373,654. Not subject to opposition. V-8 Oil Co., Long Beach, Calif.; Nov. 26, '38; for crude petroleum oil and refined products thereof; since Oct. 1, '38.

373,659. Not subject to opposition. Potter & Hunter, Akron, O.; Jan. 5, '39; for gasoline and lubricating oils; since Apr. 6, '38.

404,834. Delma Agency, Ltd.; Toronto, Ontario, Can., to Nu-Wall Industries, Ltd., a corp. of Ont., Can.; Apr. 4, '38; for water paints; since Jan. 10, '38.

411,001. G. P. Lourmas and D. K. Kyriacopoulo, Athens, Greece; Sept. 26, '38; for products increasing the calorific value of lignites, charcoals, peat, coke, etc.; for binders for briquetting lignites, etc., and for briquettes of same; since Nov. 14, '36.

412,305. Rinshed-Mason Co., Detroit, Mich.; Nov. 2, '38; for primer for enamel or the like; since Oct. 26, '38.

414,084. Shaverette Co., Chicago, Ill.; Dec. 21, '38; for chemical preparation for enhancing the edge of razor blades and other cutting instruments; since Nov. 23, '38.

413,974. John R. Avey (Avey Prods. Co.), Tulsa, Okla.; Dec. 19, '38; for lubricating oils and greases and anti-corrosive oils; since Dec. 3, '38.

415,898. Kellogg Co., Battle Creek, Mich.; Feb. 10, '39; for waxed, oiled, impregnated, heat-sealing, translucent, transparent, water-, moisture-, or air-proof paper used to form containers, or the liners thereof; since Sept. 12, '38.

419,072. Campos y Querbrachales, Puerto Sastre S. A., Buenos Aires, Argentina; May 4, 1939; for tanning extracts and substances; since Dec. 20, 1938.

421,075-421,081. General Drug Co., N. Y. City; June 29, '39; for odoriferous and aromatic chemicals useful in the production of perfumes and flavoring extracts; since: (075) Aug. 15, '33; (076) July 9, '35; (077) Sept. 5, '34; (078) Oct. 3, '33; (079) Oct. 17, '33; (080) Nov. 16, '37; (081) Nov. 26, '37.

423,003. Michigan Alkali Co., Wyandotte, Mich.; Aug. 25, '39; for alkaline product for desulfurizing ferrous metal; since Aug. 15, '39.

423,018. Waverly Petroleum Products Co., Philadelphia, Pa. Filed Aug. 25, 1939. For lubricating and solvent oil. Claims use since January, 1932.

423,024. Walter L. Field (Mac-O-Lac Paints), Detroit, Mich.; Aug. 26, '39; for ready-mixed paints, varnishes, and paint enamels; since Mar. 1, '36.

423,124. California Spray-Chemical Corp., Wilmington, Del., and Richmond, Calif.; Aug. 30, '39; for parasiticides.

423,131. The Diversey Corp., Chicago, Ill.; Aug. 30, '39; for cleanser in powdered form having incidental water-softening properties; since September, '34.

423,143. Robert P. Rich (Rich Labs.), Indianapolis, Ind.; Aug. 30, '39; for shampoo-type cleaner for upholstery, rugs, or fabrics, and for woodwork, painted walls, and automobiles; since Jan. 16, '39.

423,189. Reynolds Whelan, Sharpsville, Pa.; Aug. 31, '39; for antiseptic and germicide having incidental cleansing and bleaching properties; since Feb. 5, '34.

423,256. Chicago Mfg. and Distributing Co., Chicago; Sept. 2, '39; for lubricating oils and greases; since Feb. 15, '39.

423,337. The Master Builders Co., Cleveland, O.; Sept. 6, '39; for materials for curing, protecting, and coloring concrete surfaces; since Sept. 1, '38.

423,339. Frank E. Posey, doing business as Soot-Eater Mfg. Co., Hamtramck, Mich. Filed Sept. 6, 1939. No claim is made to the words "Soot," "Heats It," "Before," and "After" apart from the mark. For chemical preparations for eliminating soot and carbon scales from furnaces, stove pipes, and the like. Claims use since June 9, 1939.

423,441. The Sinclair Mfg. Co., Toledo, O.; Sept. 8, '39; for bleaching and disinfecting solutions; since July 29, '37.

423,461. Gagg Chemical Company, Miami, Fla. Filed Sept. 9, 1939. For soaps, cleaning compounds and metal polishes—Namely, a brass polish, a chromium polish, liquid and semi-liquid soap, a detergent cleaning compound for paint, canvas, and enamel, and a compound for cleaning and sweetening the bilges of boats. Claims use since June 15, '39.

423,488. D. Blum & Co., Inc., N. Y. City; Sept. 11, '39; for moth crystals; since Feb. '37.

423,569. London & Co., Inc., Elizabeth, N. J.; Sept. 13, '39; for all-grain alcohol; since June 28, '38.

423,580. United Buyers Corp. (Foodcraft Prods.), Chicago, Ill.; Sept. 13, '39; for laundering soap, metal polish, glass cleaner, scouring powder, and soap chips; since Sept. 1, '35.

423,690. Linco Prods. Corp., Chicago, Ill.; Sept. 15, '39; for general household cleanser; since Aug. 28, '39.

423,727. Curtain-Howe Corp., N. Y. City; Sept. 19, '39; for organic coating compositions—namely, lacquers, varnishes, paint enamels, paints in ready-mixed form, and paint vehicles; since Aug. 15, '39.

423,489. D. Blum & Co., Inc., N. Y. City; Sept. 11, '39; for solvent for cleaning and removing stains from textile fabrics; since September, 1934.

423,739. The Preservaline Mfg. Co., Brooklyn, N. Y.; Sept. 19, '39; for meat curing salts and meat curing liquids; since '36 on said salts, and since Feb., '11, on said liquids.

† Trademarks reproduced and described include those appearing in the *U. S. Patent Gazettes*, Nov. 21 to Dec. 12, 1939, inclusive.

New San Francisco Concern

Mortimer Fleishhacker, Jr., heads Chemicals, Inc., a new company in San Francisco. Mr. Fleishhacker has resigned from his position as vice-president of the Anglo California National Bank, to devote his entire attention to the firm which, it is reported, will build a plant for the manufacture of various chemical products in the San Francisco Bay District.

New Trade Marks of the Month

Cito
423,572

TICKS FLEAS LICE
SURE KILL
423,785

FIBROFIX
423,799

423,846

CEREMUL
423,865

TROPALK
423,884

REFRACT
-O-GRAIN
423,886

CREEPS
423,922

BUNASCO
423,968

SANI - PERMA
423,978

AMO ZERO
424,074

LAND LAX
424,154

ZEREX
424,081

SHELLZONE
424,142

ANCHOR BRAND
424,183

SOAPALITE
424,217

CAMAC
424,237

TY-PLY
424,239

GORGON
424,244

PYRAK
424,317

TAM
424,414

VISCOL
424,506

METALAN
424,516

ARROWHEAD
424,529

ACCELERATOR
424,372

"S"
424,553

CAL-TOP
424,615

PERMA-CAST
424,642

PERMA-FLO
424,644

PERMA-LAST
424,649

PERMA-LENE
424,650

PERMA-RITE
424,653

RUNIX
424,747

K-M best in asbestos
424,880

(Trade Mark Descriptions Continued)

423,752.* Maurice Brunet, Jr. (Cito Co.), New Orleans, La.; Sept. 20, '39; for cleaning fluid for cleaning typewriter type, typewriters, and parts thereof; since Aug. 24, '39.

423,785. James J. Aner (T. F. L. Insects Co.), Farmington, Mich.; Sept. 21, '39; for insecticide; since Aug. 19, '39.

423,799. Courtaulds, Ltd., London, Eng.; Sept. 21, '39; for chemical substances for the treatment of dyed yarns and fabrics, for the purpose of enabling them to retain their color; since '38.

423,846. Linco Prods. Corp., Chicago, Ill.; Sept. 22, '39; for cleanser for general household use; since Aug. 28, '39.

423,865. Socony-Vacuum Oil Co., Inc., N. Y. City; Sept. 22, '39; for emulsifiable wax compositions and wax emulsions for sizing paper and other industrial uses; since Aug. 9, '39.

423,884; 423,886. Harris-Seybold-Potter Co., Cleveland, O.; Sept. 23, '39; for photographic chemicals; use since Aug. 1, '39.

423,922. Russell D. Mullenix, Waterloo Ia.; Sept. 25, '39; for penetrating oil to be used in the lubrication of rusted surfaces and removal of rust in joints; since Sept. 23, '39.

423,968. Butler Naval Stores Co., Inc.; Butler, Ga.; Sept. 27, '39; for turpentine; since July 19, '38.

423,978. Golding Bros. Company, Inc., New York, N. Y. Filed Sept. 27, 1939. For chemical fluid for treating fabric to make it sanitary. Claims use since Aug. 1, '39.

424,074. The American Oil Co., Baltimore, Md.; Sept. 30, '39; for anti-freezes for automobile radiators; since Sept. 25, '39.

424,154. Bone Dry Fertilizer Co., Richmond, Va.; Oct. 3, '39; for agricultural lime; since Jan. 15, '33.

424,081. E. I. du Pont de Nemours and Co., Wilmington, Del.; Sept. 30, '39; for anti-freeze solutions for automobile radiators; since Sept. 21, '39.

424,142. Shell Oil Co., Inc.; St. Louis, Mo.; Oct. 2, '39; for anti-freeze solutions; since July 22, '39.

424,183. The Solvay Process Co., N. Y. City; Oct. 3, '39; for caustic soda; since April, '23.

424,217. The Cowles Detergent Co., Cleveland, O.; Oct. 4, '39; for detergent compound used in laundering textile articles; since Apr. 18, '39.

424,237. MacMillan & Cameron Co., Wilmington, N. C.; Oct. 5, '39; for motor oil; since Jan. 15, '32.

424,239. Marbon Corp., Gary, Ind.; Oct. 5, '39; for rubber derivative for bonding rubber to metals; since Sept. 15, '39.

424,244. Edward H. K. Sanxay (E. H. Kellogg & Co.), N. Y. City; Oct. 5, '39; for lubricating oils; since Feb. 1, '32.

424,317. The Texas Co., N. Y. City; Oct. 7, '39; for lubricating greases; since Sept. 26, '39.

424,414. The Titanium Alloy Mfg. Co., Niagara Falls, N. Y.; Oct. 10, '39; for chemical compounds, opaquing agents, and pigments for enamel and glaze manufacture; and for titanium, zirconium, their compounds, and mixtures containing said compounds; since July 15, '25.

424,506. The Viscol Co., Stamford, Conn.; Oct. 12, '39; soap for cleaning and polishing leather and fibrous materials; since Sept. 20, '39.

424,516. General Dyestuff Corp., N. Y. City; Oct. 13, '39; for dyes and dyestuffs; since Sept. 22, '39.

424,529. U. S. Lime Prods. Corp., San Francisco, Calif.; Oct. 13, '39; for limestone in various sizes, used for chicken grits; since Sept. 21, '39.

424,372. Swift & Co., Chicago, Ill.; Oct. 9, '39; for glue; since Sept. 15, '39.

424,553. Philadelphia Quartz Co., Phila., Pa.; Oct. 14, '39; for a silicate of soda cleansing material for supporting the action of soap in laundries, and in the industrial cleansing of food containers, ceramics, etc.; since Jan. 1, 1900.

424,615. Atlantic Calsomine Co., Inc., Brooklyn, N. Y.; Oct. 17, '39; for mixed paint; since Sept. 25, '39.

424,642; 424,644; 424,649; 424,650; 424,653; the Brunswick-Balke-Collender Co., Chicago, Ill.; Oct. 18, '39; for bowling alley finishes, and for polish, thinner and shellac therefore; since Oct. 5, '39.

424,747. Ralph S. Willard (Runix Mfg. Co.), Los Angeles; Oct. 20, '39; for run-resisting compound for hosiery, lingerie, and silk or rayon fabrics; since Oct. 9, '39.

424.880. Keasbey & Mattison Co., Ambler, Pa.; Oct. 25, '39; for packings and gaskets of all types and forms; since Oct. 1, '37.

Appointed General Manager

T. J. Kenny has resigned his position as director of trade sales for Devoe & Raynolds, to become general manager of Cameron & Barkley Co., Charleston, S. C. He joined Devoe & Raynolds in 1927 as general credit manager, following 8 years' service with Union Carbide units, in charge of credits. Mr. Kenny will make his home in Charleston in the near future, as general manager for Cameron & Barkley, one of the largest and oldest mill supply houses in the Southeast.

News of the Companies

National Chemical Corp., San Antonio, Tex., has been formed, with a capitalization of $5,000. The incorporators are F. D. Ensley, Mary L. Ensley, and John H. Fitzhugh.

Proctor Chem. Co., Charlotte, N. C., manufacturer of textile chemicals and specialties, will establish a plant in Salisbury, N. C., where it has already leased space.

Du-Lite Chem. Corp., Middletown, Conn., is now making and marketing a product used extensively for blackening metal finishes, especially on hardware and fire arms.

* Note: In the top left trade mark the number should be 423,752, instead of 423,572.

New Products

Synthetic Resins in Water Treatment

The investigation of the ion-exchange value of the synthetic resins carried out at the National Chemical Laboratory at Teddington, England, seems likely to prove of industrial importance. A series of specially prepared resins were put on the market in 1938 by the I. G. Farbenindustrie under the trade name "Wolfatits." Although of such comparatively recent introduction, a paper by Dr. A. Richter, in the "Angewandte Chemie," of November 25 last, makes it clear that a good deal of experience has already been gained in the use of these products and that several water-treatment plants have been erected and operated satisfactorily. A first small plant was for the complete removal of the salts content of deep well water, the second for the similar treatment of natural water to be used as feed for a pressure boiler.

The German investigations, as detailed by Richter, have established a number of interesting new facts on the process. For instance, in the exchange of anions, the divalent sulfate ion is easily and completely removed, while the removal of such monovalent ions as chlorine and nitrate is rather slower and less complete. The desalting process is effected in two steps; in the first, the cations are removed by hydrogen-ion exchangers, with the formation of free mineral acids, the resin in this case being regenerated with hydrochloric acid. In the second stage the free acids interact with hydroxyl-ion exchangers, the exchanger in this case being regenerated by means of alkali solutions. For the first stage, resins made from nuclearly sulfonated aromatic compounds have proved most suitable. *Chem. Trade Jour. and Chem. Eng., Feb. 9, 1940.*

Copper Oxide as Spray

Red copper oxide applied as a spray to greenhouse seedlings to prevent damping-off, stem cankers, and leaf diseases in place of bordeaux mixture or copper-lime dust is being recommended by plant disease specialists at the State Experiment Station at Geneva, N. Y., on the basis of evidence accumulated in numerous tests. The great advantage of red copper oxide over the other materials lies in the fact that it does not stunt the plants as does bordeaux mixture, for example. This stunting of the plants by bordeaux has done much to discourage the use of any spray by many growers, say the Station specialists. Indications are that the lime in the bordeaux mixture is responsible for the stunting effect. The red copper oxide spray is, of course, free from lime.

Synthetic Belt Coatings

Conveyor installations, on which conveyor belting is used are often idle for considerable periods. During this idleness belting covers may suffer greater deterioration through the effects of sunlight and air, than when the belting is in use. This deterioration also takes place when belts are in storage. As a result of research into the merits of various compositions, there is now being offered a new synthetic coating for belting covers, which on the basis of tests, will greatly reduce the effects of aging. Samples of conveyor belting with covers under severe tension were coated with the synthetic composition, and exposed for six months to all varieties of weather. At the end of the period none of the samples of belting on which the new coating had been applied showed any evidences of cover deterioration.

Cross Chemical Works, Los Angeles, last month opened its new research laboratory and pilot plant, under the direction of S. M. Finch. Company specializes in pharmaceutical research and private formulae compounding.

Heavy Chemicals, Coal-Tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

PRICES CURRENT

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1939 Average $1.24 - Jan. 1939 $1.25 - Feb. 1940 $1.17

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Acetaldehyde, drs, c-l, wks lb.	...	.11	...	.11	.10	.14
Acetaldol, 95%, 50 gal drs wks lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kgs lb.	.28	.50	.28	.50	.28	.50
Acetanilid, tech, 150 lb bbls lb.	...	.22	...	.22	.22	.29
Acetic Anhydride, drs, f.o.b. wks, frt all'd lb.	.10½	.11	.10½	.11	.10½	.11
Acetin, tech, drs lb.	...	.33	...	.33	...	.33
Acetone, tks, f.o.b. wks, frt all'd lb.	...	.05¾	...	.05¾	.04¼	.06
drs, c-l, f.o.b. wks, frt all'd' lb.	...	.07¼	...	.07¼	.05¾	.07¼
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68

ACIDS

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Abietic, kgs, bbls lb.	.08¾	.09	.08¾	.09	.08¾	.09
Acetic, 28%, 400 lb bbls, c-l, wks 100 lbs.	...	2.23	...	2.23	...	2.23
glacial, bbls, c-l, wks 100 lbs.	...	7.62	...	7.62	...	7.62
glacial, USP bbls, c-l, wks, 100 lbs.	...	10.25	...	10.25	...	10.25
Acetylsalicylic, USP, 225 lb bbls lb.	...	.40	...	.40	.40	.50
Adipic, kgs, bbls lb.	...	.72	...	.72	...	.72
Anthranilic, ref'd, bbls lb.	1.15	1.20	1.15	1.20	1.15	1.20
tech bbls lb.	...	.75	...	.75	...	.75
Ascorbic, bot oz.	2.75	3.00	2.75	3.00	2.75	3.25
Battery, cbys, wks 100 lbs.	1.60	2.55	1.60	2.55	1.60	2.55
Benzoic tech, 100 lb kgs lb.	.43	.47	.43	.47	.43	.47
USP, 100 lb kgs lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv ton *a*	...	96.00	...	96.00	...	96.00
Broenner's, bbls lb.	...	1.11	...	1.11	...	1.11
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks lb.	...	.22	...	.22	...	.22
wks, lcl lb.	...	.23	...	.23	...	.23
tks, wks lb.	...	.21	...	.21	...	.21
Camphoric, drs lb.	5.50	5.70	5.50	5.70	5.50	5.70
Caproic, normal, drs lb.	...	.35	...	.35	...	.35
Chicago, bbls lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¾%, drs, delv lb.	.15¼	.17¼	.15¼	.17¼	.15¼	.17¼
Citric, USP, crys, 230 lb bbls lb. *b*	.20	.21½	.20	.21½	.20	.22½
anhyd, gran bbls lb *b*	...	.23	...	.23	.23	.25
Cleve's, 250 lb bbls lb.	...	.57	...	.57	...	.57
Cresylic, 99%, straw, HB, drs, wks, frt equal gal.	.68	.70	.68	.70	.49	.70
99%, straw, LB, drs, wks, frt equal gal.	.68	.75	.68	.75	.55	.75
resin grade, drs, wks, frt equal lb.	.08¾	.09¾	.08¾	.09¾	.08¼	.09¾
Crotonic, bbls, delv lb.	.21	.50	.21	.50	.21	.50
Formic, tech, 140 lb drs lb.	.10½	.11½	.10½	.11½	.10½	.11½
Fumaric, bbls lb.	.24	.25	.24	.75	...	.75
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls lb.	.75	.80	.75	.80	.70	.73
USP, bbls lb.	.92	.95	.92	.95	.77	.81
Gamma, 225 lb bbls, wks lb.	...	.85	...	.85	...	.85
H, 225 lb bbls, wks lb.	...	.45	...	.45	.50	.55
Hydriodic, USP, 47% lb.	...	2.30	...	2.30	...	2.30
Hydrobromic, 34% conct 155 lb cbys, wks lb.	.42	.44	.42	.44	.42	.44
Hydrochloric, see muriatic						
Hydrocyanic, cyl, wks lb.	.80	1.00	.80	1.00	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks lb.	.06	.06½	.06	.06½	.06	.07½
Hydrofluosilicic, 35%, 400 bbls, wks lb.	.09	.09½	.09	.09½	.09	.09½
Lactic, 22%, dark, 500 lb bbls lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
22%, light ref'd, bbls lb.	.03½	.03¾	.03½	.03¾	.03½	.03¾
44%, light, 500 lb bbls lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
44%, dark, 500 lb bbls lb.	.06½	.06¾	.06½	.06¾	.06½	.06¾
50%, water white, 500 lb bbls lb.	.10½	.11½	.10½	.11½	.10½	.11½
USP X, 85%, cbys lb.	.42	.45	.42	.45	.42	.45
Lauric, drs lb.	.14	.14½	.14	.14½	.11¾	.12¼
Laurent's, 250 lb bbls lb.	.45	.46	.45	.46	.45	.46
Maleic, powd, kgs lb.	.30	.40	.30	.40	.30	.40
Malic, powd, kgs lb.	...	.47	...	.47	.45	.60
Metanillic, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.15	.18	.15	.18	.16	.18
Monosulfonic, bbls lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks 100 lb.	...	1.50	...	1.50	...	1.50
tks, wks 100 lb.	...	1.00	...	1.00	...	1.00
20°, cbys, c-l, wks 100 lb.	...	1.75	...	1.75	...	1.75
tks, wks 100 lb.	...	1.10	...	1.10	...	1.10
22°, c-l, cbys, wks 100 lb.	...	2.25	...	2.25	...	2.25
tks, wks 100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.14	nom.	.14	nom.	.10	.14
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks 100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv lb.	.11½	.12½	.11½	.12½	11½	.12½
Oxalic, 300 lb bbls, wks, or N Y lb.	.10¾	.12	.10¾	.12	.10¾	.12
Phosphoric, 85%, USP, cbys lb.	.12	.14	.12	.14	.12	.14
50%, acid, c-l, drs, wks lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks lb.	...	.07½	...	.07½	...	.07½
Picramic, 300 lb bbls, wks lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks lb.	.35	.40	.35	.40	.35	.40
Propionic, 98% wks, drs lb.	...	.25	...	.25	...	.22
80% lb.	...	.20	...	.20	.16	.17½
Pyrogallic, tech, lump, pwd, bbls lb.	...	1.05	...	1.05	1.45	1.63
cryst, USP lb.	1.55	2.10	1.55	2.10	1.55	2.10
Ricinoleic, bbls lb.	.27	.33	.27	.33	...	.35
tech, bbls lb.	...	.13	...	.13	...	.13
Salicylic, tech, 125 lb bbls, wks lb.	...	.33	...	.33	...	.33
USP, bbls lb.	.35	.40	.35	.40	.35	.40
Sebacic, tech, drs, wks lb.	no prices		no prices		...	...
Succinic, bbls lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	.17	.18	.17	.18	.17	.18
Sulfuric, 60°, tks, wks ton	...	13.00	...	13.00	...	13.00
c-l, cbys, wks 100 lb.	...	1.25	...	1.25	...	1.25
66°, tks, wks ton	...	16.50	...	16.50	...	16.50
c-l, cbys, wks 100 lb.	...	1:50	...	1.50	...	1.50
CP, cbys, wks lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls lb.	.44	.46	.44	.46	.40	.47
Tartaric, USP, gran, powd, 300 lb bbls lb.	.35¼	.35¾	.35¼	.35¾	.27½	.31¼
Tobias, 250 lb bbls lb.	.55	.60	.55	.60	.55	.67
Trichloroacetic bottles lb.	2.00	2.50	2.00	2.50	2.00	2.50
kgs lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls lb.	no prices		no prices		1.70	1.80
Vanadic, drs, wks lb.	no prices		no prices		1.10	1.20
Albumen, light flake, 225 lb. bbls lb.	.55	.62	.55	.62	.52	.68
dark, bbls lb.	.13	.18	.13	.18	.13	.18
egg, edible lb.	.56	.59	.56	.62	.58	.78

ALCOHOLS

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Alcohol, Amyl (from Pentane) tks, delv lb.	...	.101	...	.101	...	.101
c-l, drs, delv lb.	...	.111	...	.111	...	.111
lcl, drs, delv lb.	...	.121	...	.121	...	.121
Amyl, secondary, tks, delv lb.	...	.08½	...	.08½	...	.08½
drs, c-l., delv E of Rockies lb.	...	.09½	...	09½	...	.09½
Benzyl, cans lb.	.68	1.00	.68	1.00	.68	1.00
Butyl, normal, tks, f.o.b. wks, frt all'd lb. *d*	...	.09	...	.09	.07	.09
c-l, drs, f.o.b. wks, frt all'd lb. *d*	...	.10	...	.10	.08	.10
Butyl, secondary, tks, delv lb. *d*	...	.06½	...	.06½	.05½	.06½
c-l, drs, delv lb. *d*	...	.07½	...	.07½	.06½	.07½
Capryl, drs, tech, wks lb.	...	.85	...	.85	...	.85
Cinnamic, bottles lb.	2.00	2.50	2.00	2.50	2.00	2.50
Denatured, CD, 14, c-l drs, wks gal. *e*	.31½	.36½	.31½	.36½	.27½	.36½
tks, East, wks gal.	...	.25½	...	.25½	.21½	.25½
Western schedule, c-l, drs, wks gal. *e*	...	.34½	...	.34½	.34½	.37
c-l, drs, wks gal. *e*	...	.21½	...	.21½	.19½	.22
Denatured, SD, No. 1, tks,	...	.28½	...	.28½	.25½	.28½

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.; *y* Price given is per gal.

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

ADVERTISING PAGES REMOVED

Prices Current

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Alcohols (continued):						
Diacetone, pure, c-l, drs, delv lb. *f*	...	.12	...	.12	.09	.12
tech, contract, drs, c-l, delv lb.	...	.11½	...	.11½	.08½	.11½
Ethyl, 190 proof, molasses, tks gal. *g*	...	4.48	...	4.48	4.46	4.48½
c-l, drs gal. *g*	...	4.54	...	4.54	4.49	4.54½
c-l, bbls gal. *g*	...	4.55	...	4.55	4.53	4.55½
Furfuryl, tech, 500 lb drs lb.	.25	.35	.25	.35	.25	.35
Hexyl, secondary tks, delv lb.	...	.12	...	.12	...	.12
c-l, drs, delv lb.	...	.13	...	.13	...	.13
Normal, drs, wks lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delv lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs lb.	...	.073	...	.073	.073	.09
c-l, drs lb.	...	.069	...	.069	.068	.08½
tks lb.	...	.059	...	.059	...	.07½
Isopropyl, refd, 91%, c-l, drs, f.o.b. wks, frt all'd lb.	...	.36	...	.36	...	.36
Ref'd 98%, drs, f.o.b. wks, frt all'd gal.	...	.41	...	.41	...	.41
Tech 91% drs, above terms gal.	...	.33½	...	.33½	...	.33½
tks, same terms gal.	...	.28½	...	.28½	...	.28½
Tech 98%, drs, above terms gal.	...	.37½	...	.37½	...	.37½
tks, above terms gal.	...	.32½	...	.32½	...	.32½
Spec. Solvent, tks, wks gal.	...	.23½	...	.23½	.19	.23½
Aldehyde ammonia, 100 gal drs lb.	.80	.82	.80	.82	.80	.82
Aldehyde Bisulfite, bbls, delv lb.	...	.17	...	.17	...	.17
Aldol, 95%, 55 and 110 gal, drs, delv lb.	.11	.12	.11	.12	.11	.20
Alphanaphthol, crude, 300 lb bbls lb.	...	.52	...	.52	...	.52
Alphanaphthylamine, 350 lb bbls lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks 100 lb.	...	3.75	...	3.75	3.40	3.75
delv NY, Phila 100 lb.	...	3.75	...	3.75	3.40	3.75
Granular, c-l, bbls wks 100 lb.	...	3.50	...	3.50	3.15	3.50
Powd, c-l, bbls, wks 100 lb.	...	3.90	...	3.90	3.55	3.90
Chrome, bbls 100 lb.	6.50	6.75	6.50	6.75	6.50	6.75
Potash, lump, c-l, bbls, wks 100 lbs.	...	4.00	...	4.00	3.65	4.00
Granular, c-l, bbls, wks 100 lb.	...	3.75	...	3.75	3.40	3.75
Powd, c-l, bbls, wks 100 lb.	...	4.15	...	4.15	3.80	4.15
Soda, bbls, wks 100 lb.	...	3.25	...	3.25	...	3.25
Aluminum metal, c-l, NY 100 lb.	...	20.00	...	20.00	...	20.00
Acetate, 20%, bbls lb.	.07½	.09	.07½	.09	.07½	.09
Basic powd, bbls, delv lb.	.40	.50	.40	.50	.40	.50
Chloride anhyd, 99% wks lb.	.08	.12	.08	.12	.06	.12
93%, wks lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06¼	.06	.06¼	.06	.06¼
Solution, drs, wks lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
Formate, 30% sol bbls, c-l, delv lb.	...	.13	...	.13	...	.13
Hydrate, 96%, light, 90 lb bbls, delv lb.	.12½	.13½	.12½	.13½	.11¼	.13
heavy, bbls, wks lb.	.029	.03½	.029	.03½	.029	.03½
Oleate, drs lb.	.16¾	.18½	.16¾	.18½	.16¾	.18½
Palmitate, bbls lb.	...	.24½	...	.24½	.23	.24½
Resinate, pp., bbls lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls lb.	.19	.20	.19	.20	.16	.22½
Sulfate, com, c-l, bgs, wks 100 lb.	...	1.15	...	1.15	...	1.15
c-l, bbls, wks 100 lb.	...	1.35	...	1.35	...	1.35
Sulfate, iron-free, c-l, bags, wks 100 lb.	...	1.45	...	1.45	...	1.45
c-l, bbls, wks 100 lb.	...	1.65	...	1.65	...	1.65
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd fert com, tks lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	...	.16	...	.16	...	.16
50 lb cyl lb.	...	.22	...	.22	...	.22
26°, 800 lb drs, delv lb.	.02¼	.02½	.02¼	.02½	.02¼	.02½
Aqua 26°, tks, NH cont.	...	.04z	...	.04z	...	.04z
Ammonium Acetate, kgs lb.	.27	.33	.27	.33	.26	.33
Bicarbonate, bbls, f.o.b. wks 100 lb.	...	5.56	...	5.56	5.15	5.71
Bifluoride, 300 lb bbls lb.	.14½	.16½	.14½	.16½	.14½	.16½
Carbonate, tech, 500 lb bbls lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb bbls, wks 100 lb.	4.45	4.90	4.45	4.90	4.45	4.90
Gray, 250 lb. bbls, wks 100 lb.	5.50	6.25	5.50	6.25	5.50	6.25
Lump, 500 lb cks spot lb.	.10½	.11	.10½	.11	.10½	.11
Lactate, 500 lb bbls lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls lb.	...	.23	...	.23	...	.23
Linoleate, 80% anhyd, bbls lb.	...	.12	...	.12	.11	.15
Naphthenate, bbls lb	...	.17	...	.17	...	.17
Nitrate, tech, bbls lb.	...	.0455	...	.0455	.036	.0455
Oleate, drs lb.	...	.14	...	.14	.11	.14
Oxalate, neut, cryst, powd, bbls lb.	.19	.20	.19	.20	.19	.20
Perchlorate, kgs lb.	.17	.19	.17	.19		.16
Persulfate, 112 lb kgs lb.	.21	.22	.21	.22	.21	.24
Phosphate, diabasic tech, powd, 325 lb bbls lb.	.07½	.10	.07½	.10	.07½	.10
Ricinoleate, bbls lb.	...	.15	...	.15	...	.15
Stearate, anhyd, bbls lb.	...	.24½	...	.24½	.22	.24½
Paste, bbls lb.	...	.06½	...	.06½	.06½	.08

g Grain alcohol 25c a gal. higher in each case. ** On a delv. basis. *z* On a f.o.b. wks. basis.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Ammonium (continued):						
Sulfate, dom, f.o.b., bulk ton	...	28.00	...	28.00	27.00	28.00
Sulfocyanide, pure, kgs lb.	...	.65	...	.65	.55	.65
Amyl Acetate (from pentane) tks, delv lb.	...	.095	...	.095	.095	.10
c-l, drs, delv lb.	...	.105	...	.105	.105	.11
lcl, drs, delv lb.	...	.115	...	.115	.115	.112
tech drs, delv lb.	...	.12½	...	.12½	.10½	.12½
Secondary, tks, delv lb.	...	.08½	...	.08½	...	.08½
c-l, drs, delv lb.	...	.09½	...	.09½	...	.09½
tks, delv lb.	...	.08½	...	.08½	...	.08½
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks lb.	.0565	.0665	.0565	.0665	.0565	.077
tks, wks lb.	...	.0465	...	.0465	.0465	.06
Mercaptan, drs, wks lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs lb.	...	.25	...	.25	...	.25
Stearate, lcl, wks, drs lb.	...	.26	...	.26	...	.26
Amylene, drs, wks lb.	.102	.11	.102	.11	.102	.11
tks, wks lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks lb.	...	.14½	...	.14½	.14½	.17½
Annatto fine lb.	.34	.39	.34	.39	.34	.39
Anthracene, 80% lb.	...	.55	...	.55	.55	.75
Anthraquinone, sublimed, 125 lb bbls lb.	...	.65	...	.65	...	.65
Antimony metal slabs, ton lots lb.	...	.14	...	.14	.11¼	.14
Butter of, see Chloride.						
Chloride, soln, cbys lb.	...	.17	...	.17	...	.17
Needle, powd, bbls lb.	...	.18	...	.18	.12	.20
Oxide, 500 lb bbls lb.	no prices		no prices		.10	.15¾
Salt, 63% to 65%, tins lb.	.42	nom.	.42	nom.	.25¾	.42
Archil, conc, 600 lb bbls lb.	no prices		no prices		.21	.27
Double, 600 lb bbls lb.	no prices		no prices		.18	.20
Aroclors, wks lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbls lb.	.09	.09½	.09	.10	.08½	.09
Arsenic, Metal lb.	...	...	...	...	.40	.60
Red, 224 lb cs kgs lb.	.17½	.18	.17½	.18	.18	.19
White, 112 lb kgs lb.	.03	.03¾	.03	.03¾	.03	.03¾
B						
Barium Carbonate precip, 200 lb bgs, wks ton	52.50	62.50	52.50	62.50	52.50	62.50
Nat (witherite) 90% gr, c-l, wks, bgs ton	45.00	47.00	45.00	47.00	41.00	47.00
Chlorate, 112 lb kgs, NY lb.	.20	.22	.20	.22	.16½	.25
Chloride, 600 lb bbls, delv, zone 1 ton	77.00	92.00	77.00	92.00	77.00	92.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.12	.11	.12
Hydrate, 500 lb bbls lb.	.04½	.05	.04½	.05	.04½	.05½
Nitrate, bbls lb.	.09½	.10½	.09½	.10½	.06¾	.10½
Barytes, floated, 350 lb bbls c-l, wks ton	...	25.15	...	25.15	...	23.65
Bauxite, bulk, mines ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, 325 mesh, bgs, wks ton	...	16.00	...	16.00	...	16.00
200 mesh ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb. drs, wks lb.	.55	.60	.55	.60	.60	.62
Benzene (Benzol), 90%, Ind. 8000 gal tks, frt all'd gal.	...	.16	...	.16	...	.16
90% c-l, drs gal.	...	.21	...	.21	...	.21
Ind pure, tks, frt all'd gal.	...	.16	...	.16	...	.16
Benzidine Base, dry, 250 lb bbls lb.	...	.70	...	.70	.70	.72
Benzoyl Chloride, 500 lb drs lb.	.23	.28	.23	.28	.40	.45
Benzyl Chloride, 95-97% rfd, drs lb.	.19	.21	.19	.21	.30	.40
Beta-Naphthol, 250 lb bbls, wks lb.	.23	.24	.23	.24	.23	.24
Naphthylamine, sublimed, 200 lb bbls lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls lb.	.51	.52	.51	.52	.51	.52
Bismuth metal lb.	...	1.25	...	1.25	1.05	1.25
Chloride, boxes lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes lb.	3.35	3.40	3.35	3.40	3.15	3.40
Oxychloride, boxes lb.	...	3.10	...	3.10	2.95	3.10
Subbenzoate, boxes lb.	3.25	3.30	3.25	3.30	3.25	3.30
Subcarbonate, kgs lb.	1.73	1.76	1.73	1.76	1.43	1.76
Trioxide, powd, boxes lb.	...	3.57	...	3.57	...	3.57
Subnitrate, fibre, drs lb.	1.48	1.51	1.48	1.51	1.23	1.51
Blanc Fixe, 400 lb bbls, wks ton *h*	50.00	80.00	50.00	80.00	40.00	80.00
Beaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	...	2.00	...	2.00	...	2.00
lcl, drs, wks lb.	2.25	3.60	2.25	3.60	2.25	3.60
Blood, dried, f.o.b., NY unit	...	3.10	3.10	3.35	2.50	4.25
Chicago, high grade unit	...	3.25	3.25	3.50	2.30	4.25
Imported shipt unit	...	3.20	3.20	3.30	2.65	3.90
Blues, Bronze Chinese Prussian Soluble lb.	.36	.37	.33	.37	.33	.37
Milori, bbls lb.	.33	.34	.33	.34	.33	.37
Ultramarine,* dry, wks, bbls lb.	...	.11	...	.11	...	.11
Regular grade, group 1 lb.	...	.16	...	.16	...	.16
Special, group 1 lb.	...	.19	...	.19	...	.19
Pulp, No. 1 lb.	.22	.27	.22	.27	...	.27
Bone, 4½ + 50% raw, Chicago ton	32.00	33.00	32.00	33.00	27.00	35.00
Bone Ash, 100 lb kgs lb.	.06	.07	.06	.07	.06	.07
Meal, 3% & 50%, imp ton	...	32.00	...	32.00	22.00	32.00
Domestic, bgs, Chicago ton	...	32.00	...	32.00	24.00	32.00
Borax, tech, gran, 80 ton lots, sacks, delv ton *i*	...	43.00	...	43.00	...	43.00
bbls, delv ton *i*	...	53.00	...	53.00	...	53.00

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; *Freight is equalized in each case with nearest producing point.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Borax (continued)						
Tech, powd, 80 ton lots, sacks ... ton *i*	...	47.00	...	47.00	...	47.00
bbs, delv ... ton *i*	...	57.00	...	57.00	...	57.00
Bordeaux Mixture, drs ... lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases ... lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	...	.57	...	.57	.90½	.92½
Gold, blk ... lb.	.60	.65	.60	.65	.45	.65
Butanes, com 16-32° group 3 tks ... lb.	.02¼	.03¾	.02¼	.03¾	.02¼	.03¾
Butyl, Acetate, norm drs, frt all'd ... lb.	...	.10	...	.10	.09	.10
tks, frt all'd ... lb.	...	.09	...	.09	.08	.09
Secondary, tks, frt all'd lb.	...	.06½	...	.06½	.05½	.06½
drs, frt all'd ... lb.	.07½	.08	.07½	.08	.068	.08
Aldehyde, 50 gal drs, wks ... lb.	.15½	.17½	.15½	.17½	.15½	.17½
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	.60	.75
Crotonate, norm, 55 and 110 gal drs, delv ... lb.	...	.35	...	.35	.35	.75
Lactate ... lb.	.23½	.24½	.23½	.24½	.22½	.24½
Oleate, drs, frt all'd ... lb.	...	.25	...	.25	...	.25
Propionate, drs ... lb.	.16½	.17	.16½	.17	.16½	.18½
tks, delv ... lb.	...	.15½	...	.15½	.15½	.17
Stearate, 50 gal drs ... lb.	...	.28½	...	.28½	.26½	.28½
Tartrate, drs ... lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.	...	.35½	...	.35½	...	.35½
C						
Cadmium Metal ... lb.	.80	.85	.80	.85	.50	.85
Sulfide, orange, boxes ... lb.	.75	.85	.75	.85	.75	.90
Calcium, Acetate, 150 lb bgs c-l, delv ... 100 lb.	...	1.90	...	1.90	1.65	1.90
Arsenate, c-l, E of Rockies, dealers, drs ... lb.	...	.06	.06	.07¼	.06¾	.07¼
Carbide, drs ... lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l ... lb.	...	1.00	...	1.00	...	1.00
Chloride, flake, 375 lb drs, burlap bgs, c-l, delv ... ton	...	22.00	...	22.00	...	22.00
paper bags, c-l, delv ... ton	23.00	36.00	23.00	36.00	23.00	36.00
Solid, 650 lb drs, c-l, delv ... ton	...	20.00	...	20.00	...	20.00
Ferrocyanide, 350 lb bbls wks ... lb.	...	.20	...	.20	...	.20
Gluconate, Pharm, 125 lb bbls ... lb.	.50	.57	.50	.57	.50	.57
Levulinate, less than 25 bbl lots, wks ... lb.	...	3.00	...	3.00	...	3.00
Nitrate, 100 lb bags ... ton	...	28.00	...	28.00	...	28.00
Palmitate, bbls ... lb.	.22	.23	.22	.23	.22	.23
Phosphate, tribasic, tech, 450 lb bbls ... lb.	.06½	.07½	.06½	.07½	.06½	.07½
Resinate, precip, bbls ... lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ... lb.	.20½	.22½	.20½	.22½	.19	.21
Camphor, slabs ... lb.	.83	.84	.83	.84	.46	.77
Powder ... lb.	.83	.84	.83	.84	.45	.47
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Black, c-l, bgs, delv, price varying with zone† ... lb.	.02¾	.03¾	.02¾	.03¾	.02¾	.03¾
lcl, bgs, f.o.b.whse ... lb.	...	.06¼	...	.06¼	...	.06¼
cartons, f.o.b. whse ... lb.	...	.06¼	...	.06¼	...	.06¼
cases, f.o.b. whse ... lb.	...	.07	...	.07	...	.07
Decolorizing, drs, c-l ... lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 55 or 110 gal drs, c-l, delv ... lb.	.05	.05½	.05	.05½	.05	.05½
Casein, Standard, Dom, grd lb.	.10½	.11	.10½	.14	.07	.23
80-100 mesh, c-l bgs ... lb.	.11	.11½	.11	.14½	.07½	.23½
Castor Pomace, 5½ NH_3, c-l, bgs, wks ... ton	...	17.50	...	17.50	16.50	18.50
Imported, ship, bgs ... ton	...	20.00	...	20.00	18.00	20.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.12	.15
Transparent, cs ... lb.	...	.20	...	.20	...	.20
Cellulose, Acetate, 50 lb kgs ... lb.	...	.33	.33	.34	.35	.36
Chalk, dropped, 175 lb bbls lb.	.02¾	.03¾	.02¾	.03¾	.02¾	.03¾
Precip, heavy, 560 lb cks lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
Light, 250 lb cks ... lb.	.03¼	.04	.03¼	.04	.03¼	.04
Charcoal, Hardwood, lump, blk, wks ... bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv* ... ton	25.00	36.00	25.00	36.00	23.00	36.00
Willow, powd, 100 lb bbls, wks ... lb.	.06	.07	.06	.07	.06	.07
Chestnut, clarified, tks, wks lb.	...	.01¾	...	.01¾	...	.01⅝
25%, bbls, wks ... lb.	...	.02½	...	.02½	...	.02
China Clay, c-l, blk mines ton	...	7.60	...	7.60	7.00	7.60
Imported, lump, blk ... ton	26.00	nom.	...	26.00	22.00	26.00
Chlorine, cyls, lcl, wks, contract ... lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract ... lb *j*	...	.05¼	...	.05¼	.05¼	.05½
Liq. tk, wks, contract 100 lb.	...	1.75	...	1.75	1.75	2.00
Multi, c-l, cyls, wks, cont ... lb.	...	1.90	...	1.90	1.90	2.15
Chloroacetophenone, tins, wks ... lb.	3.00	3.50	3.00	3.50	3.00	3.50
Chlorobenzene, Mono, 100 lb drs, lcl, wks ... lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs ... lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins ... lb.	.30	.31	.30	.31	.30	.31
Chloropicrin, comml cyls ... lb.	...	.80	...	.80	...	.80
Chrome, Green, CP ... lb.	.21	.25	.21	.25	.21	.25
Yellow ... lb.	.13½	.14½	.13½	.14½	.13½	.15½
Chromium Acetate, 8% Chrome, bbls ... lb.	...	.05¾	...	.05¾	.05	.08
Fluoride, powd, 400 lb bbl ... lb.	.27	.28	.27	.28	.27	.28

j A delivered price; * Depends upon point of delivery; † New bulk price, tank cars ¼c per lb. less than bags in each zone.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Coal tar, bbls ... bbl.	7.50	8.00	7.50	8.00	7.50	8.00
Cobalt Acetate, bbls ... lb.	...	.71	...	.71	.65	.71
Carbonate tech, bbls ... lb.	1.38	1.60	1.38	1.60	1.25	1.63
Hydrate, bbls ... lb.	...	1.78	...	1.78	...	1.78
Linoleate, solid, bbls ... lb.	...	.33	...	.33	...	.33
paste, 6%, drs ... lb.	...	.31	...	.31	...	.31
Oxide, black, bgs ... lb.	...	1.84	...	1.84	1.67	1.84
Resinate, fused, bbls ... lb.	...	.13½	...	.13½	...	.13½
Precipitated, bbls ... lb.	...	.34	...	.34	...	.34
Cochineal, gray or bk bgs lb.	.37	.38	.37	.38	.35	.38
Teneriffe silver, bgs ... lb.	.38	.39	.38	.39	.36	.39
Copper, metal, electrol 100 lb.	...	11.50	11.50	11.62½	.10	12.50
Acetate, normal, bbls, wks ... lb.	.22	.24	.22	.24	.21	.24
Carbonate, 52-54% 400 lb. bbls ... lb.	...	.16½	.16½	.169	.14½	.169
Chloride, 250 lb bbls ... lb.	...	.18	...	.18	.12½	.18
Cyanide, 100 lb drs ... lb.	...	.34	...	.34	...	.34
Oleate, precip, bbls ... lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks lb.	...	.18¾	...	.18¾	.15	.18¾
red 100 lb bbls ... lb.	...	.20	...	.20	.15¾	.20
Sub-acetate verdigris, 400 lb bbls ... lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	...	4.60	4.45	4.60	4.10	4.75
Copperas crys and sugar bulk c-l, wks ... ton	...	14.00	...	14.00	14.00	16.00
Corn Sugar, tanners, bbls 100 lb.	...	3.09	2.99	3.09	2.89	3.19
Corn Syrup, 42°, bbls 100 lb.	...	3.12	3.02	3.12	2.92	3.17
43°, bbls ... 100 lb.	...	3.17	3.07	3.17	2.97	3.22
Cotton, Soluble, wet, 100 lb bbls ... lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, powd & gran 300 lb bbls ... lb.	.28¼	.28¾	.28¼	.28¾	.22¼	.25¾
Creosote, USP 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1 tks ... gal.	.13½	.14	.13½	.14	.13½	.14
Grade 2 ... gal.	.122	.132	.122	.132	.122	.132
Cresol, USP, drs ... lb.	.09¾	.10¼	.09¾	.10¼	.09½	.10½
Crotonaldehyde, 97%, 55 and 110 gal drs, wks ... lb.	.11	.12	.11	.12	.11	.22*
Cutch, Philippine, 100 lb bale lb.	...	.04	...	.04	.04	.04½
Cyanamid, pulv, bags, c-l, frt all'd, nitrogen basis, unit	...	1.27½	...	1.27½	...	1.27½
D						
Derris root 5% rotenone, bbls ... lb.	.24	.30	.24	.30	.24	.30
Dextrin, corn, 140 lb bgs f.o.b., Chicago ... 100 lb.	...	3.50	3.40	3.50	3.30	3.75
British Gum, bgs ... 100 lb.	3.75	3.85	3.65	3.85	3.55	3.95
Potato, Yellow, 220 lb bgs lb.	...	.07¾	...	.07¾	.07	.08¾
White, 220 lb bgs, lcl lb.	.08½	.09	.08½	.09	.08	.09
Tapioca, 200 bgs, lcl ... lb.	...	.0715	...	.0715	...	.0715
White, 140 lb bgs ... 100 lb.	3.45	3.65	3.35	3.65	3.25	3.70
Diamylamine, c-l, drs, wks lb.	...	.47	...	.47	...	.47
lcl drs, wks ... lb.	...	.50	...	.50	...	.50
tks, wks ... lb.	...	.45	...	.45	...	.45
Diamylene, drs, wks ... lb.	.095	.102	.095	.102	.095	.102
tks, wks ... lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs ... lb.	.085	.092	.085	.092	.085	.092
tks, wks ... lb.	...	.075	...	.075	...	.075
Oxalate, lcl, drs, wks ... lb.	...	.30	...	.30	...	.30
Diamylphthalate, drs, wks lb.	.21	.21½	.21	.21½	.19	.21
Diamyl Sulfide, drs, wks lb.	...	1.10	...	1.10	...	1.10
Diatomaceous Earth, see Kieselguhr.						
Dibutoxy Ethyl Phthalate, drs, wks ... lb.	...	.35	...	.35	...	.35
Dibutylamine, lcl, drs, wks lb.	...	.53	...	.53	.53	.55
c-l drs, wks ... lb.	...	.50	...	.50	...	...
tks, wks ... lb.	...	.48	...	.48	...	...
Dibutyl Ether, drs, wks, lcl lb.	.24½	.25	.24½	.25	.24½	.25
Dibutylphthalate, drs, wks, frt all'd ... lb.	.19	.19½	.19	.19½	.19	.19½
Dibutyltartrate, 50 gal drs lb.	...	.50	...	.50	.45	.54
Dichlorethylene, drs ... lb.	...	.25	...	.25	...	.25
Dichloroethylether, 50 gal drs, wks ... lb.	.15	.16	.15	.16	.15	.16
tks, wks ... lb.	...	.14	...	.14	...	.14
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks lb.	no prices		no prices		no prices	
tks, wks ... lb.	no prices		no prices		no prices	
Diethanolamine, tks, wks ... lb.	...	.22½	...	.22½	.22½	.23
Diethylamine, 400 lb drs, lcl, f.o.b., wks ... lb.	...	.70	...	.70	.70	3.00
Diethylaniline, 850 lb drs lb.	.40	.52	.40	.52	.40	.52
Diethyl Carbinol, drs ... lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs lb.	.31¾	.35	.31¾	.35	.31¾	.35
Diethylorthotoluidin, drs ... lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs lb.	.19	.19½	.19	.19½	.19	.19½
Diethylsulfate, tech, drs, wks, lcl ... lb.	.13	.14	.13	.14	.13	.14
Diethyleneglycol, drs ... lb.	.14½	.15½	.14½	.15½	.14½	.17
Mono ethyl ethers, drs ... lb.	.15	.16	.15	.16	.15	.16
tks, wks ... lb.	...	.13½	...	.13½	.13½	.14
Mono butyl ether, drs ... lb.	.23	.24	.23	.24	.23	.24
tks, wks ... lb.	...	.22	...	.22	...	.22
Diethylene oxide, 50 gal drs, wks ... lb.	.20	.24	.20	.24	.20	.24
Diglycol Laurate, bbls ... lb.	.17	.21	.17	.21	.15	.23
Oleate, bbls ... lb.	...	.13	...	.13	.13	.20
Stearate, bbls ... lb.	...	.26	...	.26	.20	.28
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis ... lb.	...	1.00	...	1.00	...	1.00
Dimethylaniline, 340 lb drs lb.	.23	.24	.23	.24	.23	.24
Dimethyl Ethyl Carbinol, drs lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks, frt all'd ... lb.	...	.18½	...	.18½	...	.19
Dimethylsulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50

h Higher price is for purified material; * These prices were on a delivered basis.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Dinitrobenzene, 400 lb bbls lb. *k*	.18	.19	.18	.19	.16	.19
Dinitrochlorobenzene, 400 lb bbls ....lb.	...	.14	...	.14	.13½	.14
Dinitronaphthalene, 350 lb bbls ....lb.	.35	.38	.35	.38	.35	.38
Dinitrophenol, 350 lb bbls lb.	.22	.23	.22	.23	.22	.24
Dinitrotoluene, 300 lb bbls lb.	...	.15½	...	.15½	...	.15½
Diphenyl, bbls ....lb.	.15	.25	.15	.25	.15	.25
Diphenylamine ....lb.	.31	.32	.31	.32	.32	.32
Diphenylguanidine, 100 lb drs ....lb.	.35	.37	.35	.37	.31	.37
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	...	nom.	...	nom.	...	nom.
Extract ....lb.	.05¾	.06¾	.05¾	.06¾	.05¾	.06¾
E						
Egg Yolk, dom., 200 lb cases lb.	.57	.52	.57	.62	.59	.69
Epsom Salt, tech, 300 lb bbls c-l, NY .....100 lb.	1.90	2.10	1.90	2.10	1.90	2.10
USP, c-l, bbls .....100 lb.	...	2.10	...	2.10	...	2.10
Ether, USP anaesthesia 55 lb drs ....lb.	...	.26	...	.26	.22	.23
Isopropyl 50 gal drs ...lb.	.07	.08	.07	.08	.07	.08
tks, frt all'd ....lb.	...	.06	...	.06	...	.06
Nitrous conc bottles ...lb.	...	.68	...	.68	...	.68
Synthetic, wks, drs ...lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester tks, frt all'd' ....lb.	...	.06½	...	.06½	.051	.061
drs, frt all'd ....lb.	.07½	.08	.07½	.08	.061	.08
99%, tks, frt all'd ..lb.	...	.0685	...	.0685	.0585	.0685
drs, frt all'd ....lb.	...	.0785	...	.0785	.0685	.0785
Acetoacetate, 110 gal drs lb.	...	.27½	...	.27½	...	.27½
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Bromide, tech drs .....lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt all'd ....lb.	.45	.50	.45	.50	.45	.50
Chloride, 200 lb drs ....lb.	.18	.20	.18	.20	.22	.24
Chlorocarbonate, cbys ..lb.	...	.30	...	.30	...	.30
Crotonate, drs ....lb.	...	35	...	.35	.35	.75
Formate, drs, frt all'd lb.	.23	.24	.23	.24	.27	.28
Lactate, drs, wks ......lb.	...	.33½	...	.33½	...	.33½
Oxalate, drs, wks .....lb.	...	.25	...	.25	.30	.34
Oxybutyrate, 50 gal drs, wks ....lb.	.30	.30½	.30	.30½	.30	.30½
Silicate, drs, wks ....lb.	...	.77	...	.77	...	.77
Ethylene Dibromide, 60 lb drs ....lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont ....lb.	.75	.85	.75	.85	.75	.85
Anhydrous ....lb.	...	.75	...	.75	...	.75
Dichloride, 50 gal drs, wks lb.	.0595	.0694	.0595	.0694	.0545	.0994
Glycol, 50 gal drs, wks ..lb.	.14½	.18½	.14½	.18½	.14½	.21
tks, wks ....lb.	...	.13½	...	.13½	.13½	.16
Mono Butyl Ether, drs, wks ....lb.	.16½	.21	.16½	.21	.16½	.22
tks, wks ....lb.	...	.15½	...	.15½	.15½	.19
Mono Ethyl Ether, drs, wks ....lb.	.14½	.15	.14½	.15	.14½	.17
tks, wks ....lb.	...	.13½	...	.13½	.13½	.15
Mono Ethyl Ether Acetate, drs, wks ....lb.	.11½	.13	.11½	.13	.11½	.14
tks, wks ....lb.	...	.10½	...	.10½	.10½	.13
Mono Methyl Ether, drs wks ....lb.	.16	.17	.16	.17	.16	.22
tks, wks ....lb.	...	.14½	...	.14½	.14½	.17
Oxide, cyl ....lb.	.50	.55	.50	.55	.50	.55
Ethylideneaniline ....lb.	45	.47½	.45	.47½	.45	.47½
F						
Feldspar, blk pottery ...ton	17.00	19 00	17.00	19.00	17.00	19.00
Powd, blk wks ....ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls ....lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys ....lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground wks ....unit *l*	...	4.25	...	4.25	3.00	4.25
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis .... unit *m*	...	3.00	...	3.00	2.35	3.00
Fluorspar, 98% bgs .... lb.	...	32.60	...	32.60	30.00	33.00
Formaldehyde, USP, 400 lb bbls, wks ....lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.06¼
Fossil Flour ....lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines ton	...	10.00	...	10.00	10.00	11.00
Imp powd, c-l, bgs ....ton	...	25.00	...	25.00	23.00	30.00
Furfural (tech) drs, wks lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs ....lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.16	.17¼	.16	.17¼	.12½	.17¼
Fustic, crystals, 100 lb boxes ....lb.	.24	.28	.24	.28	.22	.28
Liquid 50°, 600 lb bbls lb.	.10½	.14	.10½	.14	.09½	.14
Solid, 50 lb boxes .....lb.	.19	.21	.19	.21	.17½	.21
G						
G Salt paste, 360 lb bbls lb.	.45	.47	.45	.47	.45	.47
Gambier, com 200 lb bgs lb.	...	.07	...	.07	.06¾	.07¾
Singapore cubes, 150 lb bgs ....100 lb.	...	.10	...	.10	.08	.10
Gelatine, tech, 100 lb cs...lb.	.42	.43	.42	.43	.42	.50
Glauber's Salt, tech, c-l, bgs, wks* .... 100 lb.	.95	1.18	.95	1.18	.95	1.18
Anhydrous, see Sodium Sulfate						

l + 10; m + 50; * Bbls. are 20c higher.

Current

Glue, Bone
Hexalene

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Glue, bone, com grades, c-l						
bgs ....lb.	.13½	.15½	.13½	.15½	.13½	.15½
Better grades, c-l, bgs lb.	.17	.18	.17	.18	.11½	.15½
Glycerin, CP, 550 lb drs lb.	...	.12½	...	.12½	...	.12½
Dynamite, 100 lb drs ...lb.	...	nom.	...	nom.	...	.09
Saponification, drs .....lb.	...	.13	...	.13	.08½	.10
Soap Lye, drs ....lb.	.07¾	.08¼	.07¾	.08¼	.07½	.07⅞
Glyceryl Bori-Borate, bbls lb.	...	.40	...	.40	...	.40
Monoricinoleate, bbls ...lb.	...	.27	...	.27	...	.27
Monostearate, bbls .....lb.	...	.30	...	.30	...	.30
Oleate, bbls ....lb.	...	.22	...	.22	...	.22
Phthalate ....lb.	...	.37	...	.37	...	.37
Glyceryl Stearate, bbls ...lb.	...	.18	...	.18	.24	.27½
Glycol Bori-Borate, bbls..lbs.	...	.22	...	.22	.22	.23
Phthalate, drs ....lb.	...	.38	...	.38	.38	.40
Stearate, drs ....lb.	...	.26	...	.26	...	.26
GUMS						
Gum Aloes, Barbadoes ...lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts ...lb.	.12¼	.12¾	.12¼	.14	.09	.24
White sorts, No. 1, bgs lb.	.33	.35	.33	.35	.23	.35
No. 2, bgs ....lb.	.32	.34	.32	.34	.21	.34
Powd, bbls ....lb.	.16¼	.18¾	.16¼	.17	.12½	.27
Asphaltum, Barbadoes (Manjak) 200 lb bgs,						
f.o.b. NY ....lb.	.02½	.10½	.02½	.10½	.02½	.10½
California, f.o.b. NY, drs ton	29.00	55.00	29.00	55.00	29.00	55.00
Egyptian, 200 lb cases,						
f.o.b. NY ....lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120						
lb cases ....lb.	.23	.24	.23	.24	.17	.34
Copal, Congo, 112 lb bgs,						
clean, opaque ....lb.	...	.29½	...	.29½	.18¼	.29½
Dark amber ....lb.	...	.11⅜	...	.11⅜	.07⅛	.11⅜
Light amber ....lb.	...	.17	...	.17	.11¼	.17
Copal, East India, 180 lb bgs						
Macassar pale bold ....lb.	...	.15⅝	...	.15⅝	.11⅜	.15¼
Chips ....lb.	...	.08½	.08½	.09	.05⅜	.08½
Dust ....lb.	...	.05½	.05½	.06¾	.03¼	.07⅛
Nubs ....lb.	...	.12½	.12½	.14⅜	.09½	.13¾
Singapore, Bold ....lb.	...	.16	.16	.17½	.14	.18¼
Chips ....lb.	...	.08⅜	.08⅜	.09⅛	.05⅝	.10¼
Dust ....lb.	...	.05½	.05½	.06¾	.03¼	.07⅛
Nubs ....lb.	...	.12⅜	.12⅜	.13½	.09⅝	.14⅜
Copal Manila, 180-190 lb						
baskets, Loba A ....lb.	...	.16	.16	.17⅜	.10½	.14⅞
Loba B ....lb.	...	.15⅝	.15⅝	.16¾	.09¾	.14½
Loba C ....lb.	...	.15½	.14⅛	.16⅛	.09	.14⅛
DBB ....lb.	...	.12⅞	.12⅞	.14½	.07⅞	.12½
Dust ....lb.	...	.07¼	.07¼	,08¾	.05⅛	.08½
MA sorts ....lb.	...	.10¾	.10¾	.13¾	.05⅞	.11
Copal Pontianak, 224 lb						
cases, bold genuine ..lb.	...	.16¾	.16¾	.18½	.15¼	.18½
Chips ....lb.	...	.09½	.09½	.10½	.07⅛	.11½
Mixed ....lb.	...	.16⅝	...	.16⅝	.13⅜	.16⅝
Nubs ....lb.	...	.12	.12	.13½	.10½	.14⅜
Split ....lb.	...	.16⅛	...	.16⅛	.12	.16⅛
Damar Batavia, 136 lb cases						
A ....lb.	...	.22¾	...	.22¾	.20	.23¾
B ....lb.	...	.21⅛	...	.21⅛	.18½	.21⅛
C ....lb.	...	.15¼	...	.15¼	.13½	.15⅝
D ....lb.	...	.13¾	...	.13¾	.12¼	.14¼
A/D ....lb.	...	.14½	...	.14½	.12¾	.15¼
A/E ....lb.	...	.13⅜	...	.13⅜	.11⅜	.13¾
E ....lb.	...	.10⅜	...	.10⅜	.07⅜	.10
F ....lb.	...	.08¾	...	.08¾	.07¼	.08¾
Singapore, No. 1 ......lb.	...	.18⅝	.18⅝	.19⅝	.13¼	.19½
No. 2 ....lb.	...	.13¾	.13¾	.15¾	.10½	.16⅜
No. 3 ....lb.	...	.09	...	.09	.05¼	.09⅛
Chips ....lb.	..	.12½	...	.12½	.09¼	.12½
Dust ....lb.	...	.07⅞	.07⅞	.09	.05¼	.09⅛
Seeds ....lb.	...	.10½	...	.10½	.07⅜	.10½
Elemi, cns, c-l ....lb.	...	.10⅛	.10⅛	.11⅝	.08⅛	.12⅝
Ester ....lb.	.06¼	.06¾	.06¼	.06¾	.06	.07
Gamboge, pipe, cases ....lb.	.70	.75	.70	.75	.55	.80
Powd, bbls ....lb.	.75	.80	.75	.80	.60	.85
Ghatti, sol, bgs ....lb.	.11	.15	.11	.15	.11	.15
Karaya, bbls, bxs, drs ...lb.	.14	.33	.14	.33	.14	.33
Kauri, NY						
Brown XXX, cases ....lb.	...	.60	...	60	.60	.60½
BX ....lb.	...	.38	...	.38	...	.38
B1 ....lb.	...	.28	...	.28	...	.28
B2 ....lb.	...	.24	...	.24	...	.24
B3 ....lb.	...	.18½	...	.18½	...	.18½
Pale XXX ....lb.	...	.61	...	.61	...	.61
No. 1 ....lb.	...	.41	...	.41	...	.41
No. 2 ....lb.	...	.24	...	.24	...	.24
No. 3 ....lb.	...	.17¾	...	.17¾	...	.17¾
Kino, tins ....lb.	4.00	4.50	4.00	4.50	2.50	4.50
Mastic ....lb.	.85	.90	.85	.90	.55	.90
Sandarac, prime quality, 200						
lb bgs & 300 lb cks...lb.	...	.37	...	.37	.15	.37
Senegal, picked bags .....lb.	...	.30	...	.30	.25	.30
Sorts ....lb.	...	.13	...	.13	.09¼	.13
Thus, bbls ....280 lbs.	15.00	15.25	15.00	15.25	13.50	15.25
Tragacanth, No. 1, cases..lb.	2.65	2.70	2.65	2.70	2.25	2.50
No. 2 ....lb.	2.55	2.60	2.55	2.60	1.90	2.40
No. 3 ....lb.	2.45	2.50	2.45	2.50	1.60	2.25
Yacca, bgs ....lb.	.03½	.04	.03½	.04	.03½	.08
H						
Helium, cyl (200 cu. ft.) cyl.	..	25.00	...	25.00	...	25.00
Hematine crystals, 400 lb bbls lb.	.20	.30	.20	.30	.20	.34
Hemlock, 25%, 600 lb bbls.						
wks ....lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03	.03⅜
tks ....lb.	...	.03	...	.03	.02⅝	.02¾
Hexalene, 50 gal drs, wks lb.	...	.30	...	.30	...	.30

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Hexane, normal 60-70° C. Group 3, tks .... gal.	...	.10½	...	.10½	...	.10½
Hexamethylenetetramine, powd, drs .... lb.	.32	.33	.32	.33	.32	.35
Hexyl Acetate, secondary, delv, drs .... lb.	.13	.13½	.13	.13½	.13	.13½
tks .... lb.	...	.12	...	.12	...	.12
Hoof Meal, f.o.b. Chicago unit	2.50	2.75	2.50	3.15	2.50	3.25
Hydrogen Peroxide, 100 vol, 140 lb cbys .... lb.	...	.20	...	.20	.19½	.20
Hydroxylamine Hydrochloride .... lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	...	.14	...	.14	.13	.21
I						
Indigo, Bengal, bbls ..... lb.	1.63	1.67	1.63	1.67	...	2.40
Synthetic, liquid ...... lb.	.16½	.19	.16½	.19	.16½	.19
Iodine, Resublimed, jars .. lb.	...	2.00	...	2.00	1.75	2.00
Irish Moss, ord, bales ... lb.	.15	.16	.15	.16	.10	.10
Bleached, prime, bales .. lb.	.28	.30	.28	.30	.19	.20
Iron Acetate Liq. 17°, bbls delv .... lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls .. 100 lb.	2.75	3.00	2.75	3.00	2.32	3.11
Isobutyl Carbinol (128-132° C) drs, wks .... lb.	.33	.34	.33	.34	.33	.34
tks, wks .... lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks, frt all'd .... lb.	...	.05½	...	.05½	.051	.06
drs, frt all'd .... lb.	.06½	.07	.06½	.07	.061	.07
Ether, see Ether, isopropyl.						
Keiselguhr, dom bags, c-l, Pacific Coast .... ton	22.00	85.00	22.00	85.00	22.00	85.00
L						
Lead Acetate, f.o.b. NY, bbls, White, broken .... lb.	...	.11	...	.11	.10	.11
cryst, bbls .... lb.	...	.11	...	.11	.10	.11
gran, bbls .... lb.	...	.11¾	...	.11¾	.10¾	.11¾
powd, bbls .... lb.	...	.11¾	...	.11¾	.10¾	.11¾
Arsenate, East, drs ... lb.	...	.08½	.08½	.11	.10	.11½
Linoleate, solid, bbls ... lb.	...	.19	...	.19	...	.19
Metal, c-l, NY ..... 100 lb.	...	5.25	...	5.25	4.75	5.55
Nitrate, 500 lb bbls, wks lb.	.11	.14	.11	.14	.10	.12
Oleate, bbls .... lb.	.18½	.20	.18½	.20	.18½	.20
Red, dry, 95% Pb_3O_4, delv .... lb.	...	.07¾	.07½	.07¾	.07¼	.08½
97% Pb_3O_4, delv ... lb.	...	.08	.07¾	.08	.07½	.0835
98% Pb_3O_4, delv ... lb.	...	.08¼	.08	.08¼	.07¾	.0860
Resinate, precip, bbls .. lb.	...	.16½	...	.16½	...	.16½
Stearate, bbls .... lb.	...	.26	...	.26	.22	.25
Titanate, bbls, c-l, f.o.b. wks, frt all'd .... lb.	.10	.10¼	.10	.10¼	.11	.11½
White, 500 lb bbls, wks, lb.	...	.07	...	.07	...	.07
Basic sulfate, 500 lb bbls, wks .... lb.	...	.06¼	...	.06¼	...	.06¼
Lime, chemical quicklime, f.o.b., wks, bulk ... ton	7.00	8.00	7.00	8.00	7.00	8.00
Hydrated, f.o.b. wks .. ton	8.50	12.00	8.50	12.00	8.50	12.00
Lime Salts, see Calcium Salts						
Lime, sulfur, dealers, tks gal.	.08	.11½	.08	.11½	.08	.11½
drs .... gal.	.11	.16	.11	.16	.11	.16
Linseed Meal, bgs ...... ton	...	36.00	36.00	37.00	34.00	42.00
Litharge, coml, delv, bbls lb.	...	.06¾	.06½	.06¾	.06¼	.071
Lithopone, dom, ordinary, delv, bgs .... lb.	...	.036	...	.036	.03¾	.04⅛
bbls .... lb.	...	.03¾	...	.03¾	.04	.04⅜
High strength, bgs ..... lb.	...	.05	...	.05	.05¼	.05⅝
bbls .... lb.	...	.05¼	...	.05¼	.05½	.05⅞
Titanated, bgs .... lb.	...	.05	...	.05	.05¼	.05⅝
bbls .... lb.	...	.05¼	...	.05¼	.05½	.05⅞
Logwood, 51°, 600 lb bbls lb.	.10½	.12½	.10½	.12½	.09½	.12½
Solid, 50 lb boxes .... lb.	.16½	.20½	.16½	.20½	.15	.20½
M						
Madder, Dutch .... lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbls ton	62.00	66.00	62.00	66.00	58.00	66.00
Magnesium Carb, tech, 70 lb bgs, wks .... lb.	...	.06¼	...	.06¼	.05¾	.06½
Chloride flake, 375 lb bbls, c-l, wks .... ton	32.00	42.00	32.00	42.00	39.00	42.00
Fluosilicate, crys, 400 lb bbls, wks .... lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, calc tech, heavy bbls, frt all'd ..... lb.	.25	.30	.25	.30	.25	.30
Light bbls above basis lb.	.20	.25	.20	.25	.20	.25
USP Heavy, bbls, above basis .... lb.	.25	.30	.25	.30	.25	.30
Palmitate, bbls .... lb.	.33	nom.	.33	nom.	.33	nom.
Silicofluoride, bbls .... lb.	.11	.11½	.11	.11½	.09½	.11½
Stearate, bbls .... lb.	.24	.27	.24	.27	.21	.24
Manganese, acetate, drs ... lb.	...	.26½	...	.26½	...	.26½
Borate, 30%, 200 lb bbls lb.	.15	.16	.15	.16	.15	.16
Chlorate, 600 lb cks .... lb.	...	.08½	...	.08½	.07½	.12
Dioxide, tech (peroxide), paper bags, c-l ...... ton	...	66.50	...	66.50	47.50	66.50
Hydrate, bbls .... lb.	...	.32	...	.32	...	.32
Linoleate, liq, drs ..... lb.	.18	.19¼	.18	.19¼	.18	.19¼
solid, precip, bbls .... lb.	...	.19	...	.19	...	.19
Resinate, fused, bbls ... lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, drs .... lb.	...	.12	...	.12	...	.12
Sulfate, tech, anhyd, 90-95%, 550 lb drs ... lb.	.08	.08½	.08	.08½	.07	.08½
Mangrove, 55%, 400 lb bbls lbs.	...	...	...	...	...	.04
Bark, African .... ton	...	32.50	32.50	35.00	23.00	35.00

Current

Mannitol
Nutgalls Alleppo

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Mannitol, pure cryst, cs, wks lb.	.95	1.00	.95	1.00	.95	1.20
commercial grd, 250 lb bbls ....lb.	.42	.50	.42	.50	.42	.57
Marble Flour, blk ......ton	12.00	14.00	12.00	14.00	12.00	14.00
Mercury chloride(Calomel) lb.	...	2.45	...	2.45	1.36	2.57
Mercury metal ..76 lb. flasks	180.00	185.00	180.00	185.00	95.00	170.00
Mesityl Oxide, f.o.b. dest., tks ....lb.	...	.15	...	.15	.10½	.15
drs, c-l ....lb.	...	.16	...	.16	.11½	.16
drs, lcl ....lb.	...	.16½	...	.16½	.12	.16½
Meta-nitro-aniline ....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ....lb.	...	1.30	1.30	1.40	1.30	1.55
Meta-phenylene diamine 300 lb bbls ....lb.	...	.65	...	.65	.80	.84
Meta-toluene-diamine 300 lb bbls ....lb.	...	.65	.65	.67	.65	.67
Methanol, denat, grd, drs, c-l frt all'd ....gal.	...	.45	...	.45	.41	.46
tks, frt all'd ....gal.	...	.40	...	.40	.35	.40
Pure, drs, c-l, frt all'd' gal.	...	.38	...	.38	...	.38
tks ....gal.	...	.33	...	.33	...	.33
95%, tks ....gal.	...	.31	...	.31	...	.31
97%, tks ....gal.	...	.32	...	.32	...	.32
Methyl Acetate, tech tks, delv ....lb.	.06	.07	.06	.07	.06	.06½
55 gal drs, delv .....lb.	.07	.08	.07	.08	.07	.08
C.P. 97-99%, tks,delv lb.	.09½	10½	.09½	.10½	...	.06¼
55 gal drs, delv .....lb.	.10½	.11½	.10½	.11½	.07¼	.07¾
Acetone, frt all'd, drs gal. *p*	.41	.44	.41	.44	.30	.44
tks, frt all'd, drs..gal. *p*	.35	.39	.35	.39	.25	.35
Synthetic, frt all'd, east of Rocky M., drs ....gal. *p*	...	.44	.38	.44	.38	.41
tks, frt all'd ...gal.	...	.36	...	.36	...	.31½
West of Rocky M., frt all'd, drs..gal. *p*	...	.48	.42	.48	...	.42
tks, frt all'd...gal. *p*	...	.39½	.35	.39½	...	.35
Anthraquinone ....lb.	...	.83	...	.83	...	.83
Butyl Ketone, tks .....lb.	...	.10½	...	.10½	...	.10½
Cellulose, 100 lb lots, frt all'd ....lb.	...	.70	...	.70	...	...
less than 100 lbs. f.o.b. wks ....lb.	...	.75	...	.75	...	...
Chloride, 90 lb. cyl ....lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone, tks,frt all'd lb.	...	.05½	...	.05½	.05	.05½
50 gal drs, frt all'd' c-l lb	.06½	.07	.06½	.07	.06	.07
Formate, drs, frt all'd..lb.	...	.89	...	.89	.35	.39
Hexyl, Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt all'd...lb.	...	.80	...	.80	...	.30
Mica, dry grd, bgs, wks..ton	...	30.00	...	30.00	...	30.00
Michler's Ketone, kgs ...lb.	...	2.50	...	2.50	...	2.50
Monoamylamine,c-l,drs,wks lb.	...	.52	...	.52	...	.52
lcl, drs, wks ....lb.	.53	.55	.53	.55	...	...
tks, wks ....lb.	...	.50	...	.50	...	...
Monobutylamine, drs, c-l, wks ....lb.	...	.50	...	.50	.50	.65
lcl, wks ....lb.	.51	.53	.51	.53	...	...
tks, wks ....lb.	...	.48	...	.48	...	...
Monochlorobenzene, see "C"						
Monoethanolamine, tks, wks lb.	...	.23	...	.23	...	.23
Monoethylamine (100% basis) lcl, drs, f.o.b. wks ....lb.	...	.65	...	.65	...	...
Monomethylamine, drs, frt all'd, E Mississippi, c-l lb.	...	.65	...	.65	...	.65
Monomethylparamiosulfate, 100 lb drs ....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Morpholine, drs 55 gal, lcl wks ....lb.	...	.75	...	.75	...	...
Myrobalans 25%, liq bbls lb.	no prices		no prices		.03¾	.04¼
50% Solid, 50 lb boxes lb.	no prices		no prices		.04¾	.05
J1 bgs ....ton	...	30.00	30.00	32.00	24.00	50.00
J2 bgs ....ton	...	25.00	23.00	25.00	19.00	41.00
N						
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-whte, tks ....gal.	...	.27	...	.27	.26	.27
drs, c-l ....gal.	...	.32	...	.32	.31	.32
Naphthalene, dom, crude bgs. wks ....lb.	2.25	2.75	2.25	2.75	2.25	2.85
imported, cif, bgs ...lb.	...	2.90	...	2.90	1.50	1.85
Balls, flakes, pks ......lb.	...	.07½	...	.07½	.06½	.07½
Balls, ref'd, bbls, wks..lb.	...	.06¾	...	.06¾	.05¾	.06¾
Flakes, ref'd, bbls, wks lb.	...	.06¾	...	.06¾	.05¾	.06¾
Nickel Carbonate, bbls...lb.	.36	.36½	.36	.36½	.36	.37½
Chloride, bbls ....lb.	.18	.20	.18	.20	.18	.20
Metal ingot ....lb.	...	.35	...	.35	...	.35
Oxide, 100 lb kgs, NY lb.	.35	.38	.35	.38	.35	.37
Salt, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Single, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate, 55 lb drs ....lb.	...	.70	...	.70	.70	.76
Nitre Cake, blk ....ton	...	16.00	...	16.00	...	16.00
Nitrobenzene redistilled,1000 lb drs, wks ....lb.	.08	.09	.08	.10	.08	.10
tks ....lb.	...	.07	...	.07	.07	.07½
Nitrocellulose, c-l, lcl, wks lb.	.22	.29	.22	.29	.22	.29
Nitrogen Sol. 45½% ammon, f.o.b. Atlantic & Gulf ports, tks, unit ton, N basis	...	1.2158	...	1.2158	...	1.2158
NitrogenousMat'l,bagsimp unit	...	2.45	2.45	2.60	2.25	2.85
dom, Eastern wks ...unit	...	2.50	2.50	2.90	2.30	3.00
dom. Western wks ...unit	...	1.95	1.95	2.00	1.90	2.25
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs ...lb.	.29	.30	.29	.30	.22	.23

a Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila., or N. Y.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Oak Bark Extract, 25%, bbls lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03½
tks ....lb.	...	.02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks ...lb.	...	.15	...	.15	.15	.17
Orange-Mineral, 1100 lb cks NY ....lb.	...	.10¾	.10½	.10¾	.10¼	.10¾
Orthoaminophenol, 50 lb kgs lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	...	.70	.70	.74	.70	.74
Orthochlorophenol, drs ...lb.	...	.32	...	.32	...	.32
Orthocresol, 30.4°, drs, wks lb.	.16	.16½	.16	.16½	.14½	.17½
Orthodichlorobenzene, 1000 lb drs ....lb.	.06	.07	.06	.07	.06	.07
Orthonitrochlorobenzene, 1200 lb drs, wks ....lb.	.15	.18	.15	.18	.15	.18
Orthonitroparachlorphenol, tins ....lb.	...	.75	...	.75	...	.75
Orthonitrophenol, 350 lb drs ....lb.	.85	.90	.85	.90	.85	.90
Orthonitrotoluene, 1000 lb drs, wks ....lb.	...	.09	...	.09	.08	.10
Orthotoluidine, 350 lb bbls, lcl ....lb.	...	.19	...	.19	.16	.19
Osage Orange, cryst, bbls lb.	...	.21	...	.21	.17	.25
51° liquid ....lb.	...	.10	...	.10	.07	.09
P						
Paraffin, rfd, 200 lb bgs						
122-127° M P ....lb.	.066	.0675	.066	.0675	.03¾	.06¾
128-132° M P ....lb.	.068	.0705	.068	.0705	.04	.0705
133-137° M P ....lb.	.073	.0755	.073	.0755	.0465	.0755
Para aldehyde, 99%, tech, 110-55 gal drs, wks ..lb.	.10	.11¼	.10	.11¼	.10	.16*
Aminoacetanilid, 100 lb kgs ....lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs ....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs ......lb.	...	.32	...	.32	.30	.45
Dichlorobenzene 200 lb drs, wks ....lb.	.11	.12	.11	.12	.11	.12
Formaldehyde, drs, wks lb.	.34	.35	.34	.35	.34	.35
Nitroacetanilid, 300 lb bbls ....lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wk ....lb.	...	.47	...	.47	.45	.47
Nitrochlorobenzene, 1200 lb drs, wks ....lb.	...	.15	.15	.16	.15	.16
Nitro-orthotoluidine, 300 lb bbls ....lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	...	.35	.35	.37	.35	.37
Nitrosodimethylaniline, 120 lb bbls ....lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	...	.30	...	.30	.30	.35
Phenylenediamine, 350 lb bbls ....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls ....lb.	...	.70	.70	.75	.70	.75
tks, wks ....lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks ....lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ....lb.	...	.48	.48	.50	.48	.58
Paris Green, dealers, drs lb.	.23	.26	.23	.26	.23	.26
Pentane, normal, 28-38° C, group, 3 tks ....gal.	...	.08½	...	.08½	...	.08½
drs, group 3 ....gal.	.11½	.16	.11½	.16	.11½	.16
Perchlorethylene, 100 lb drs, frt all'd ....lb.	.08	.08½	.08	.08¾	.08	.10½
Petrolatum, dark amber, bbls. ....lb.	.03¾	...	.03¾	.05	.02⅝	.05
White, lily, bbls ......lb.	.07	.08½	.07	.08½	.05¼	.08½
White, snow, bbls .....lb.	.08	.09½	.08	.09½	.06¼	.09½
Petroleum Ether, 30-60°, group 3, tks ....gal.	...	.13½	...	.13½	.13	.13½
drs, group 3 ....gal.	.14½	.25½	.14½	.25½	.14	.25½
PETROLEUM SOLVENTS AND DILUENTS						
Cleaners naphthas, group 3, tks, wks ....gal.	06⅞	.07	.06⅞	.07	.06⅜	.07
East Coast, tks wks gal.	.09	.10½	.09	.10½	.09	.10
Hydrogenated, naphthas, frt all'd East, tks gal.	...	.16	...	.16	...	.16
No. 2, tks ....gal.	...	.18	...	.18	...	.18
No. 3, tks ....gal.	...	.16	...	.16	...	.16
No. 4, tks ....gal.	...	.18	...	.18	...	.18
Lacquer diluents, tks, East Coast ....gal.	.09½	.10	.09½	.10	.09	.12½
Group 3, tks ....gal.	...	.07⅞	...	.07⅞	.07⅜	.08
Naphtha, V.M.P., East tks, wks ....gal.	...	.09½	...	.09½	.09	.10
Group 3, tks, wks ...gal.	.06⅞	.07	.06⅞	.07	.06⅜	.07
Petroleum thinner, 43-47, East, tks, wks ......gal.	...	.09½	.08¾	.09½	.08½	.10
Group 3, tks, wks ..gal.	.06⅞	.07	.05⅞	.07	.05⅜	.06
Rubber Solvents, stand grd, East, tks, wks..gal.	...	.09½	...	.09½	.09	.10
Group 3, tks, wks ..gal.	.06⅞	.07	.06⅞	.07	.06⅜	.07
Stoddard Solvents, East, tks, wks ....gal.	.08¾	.09½	.08¾	.09½	.08½	.10
Group 3, wks ......gal.	.06⅜	.06½	.06⅜	.06½	.05⅞	.06½
Phenol, 250-100 lb drs ..lb.	.13	.14¾	.13	.14¾	.13	.15½
tks, wks ....lb.	...	.12	...	.12	.12	.13½
Phenyl-Alpha-Naphthylamine, 100 lb kgs ....lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs .....lb.	...	.17	...	.17	...	.17
Phenylhydrazine Hydrochloride, com ....lb.	...	1.50	...	1.50	...	1.50

* These prices were on a delivered basis.

	Current	Market	1940 Low	1940 High	1939 Low	1939 High
Phloroglucinol, tech, tins lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tons ....lb.	20.00	22.00	20.00	22.00	20.00	22.00
Phosphate Rock, f.o.b. mines						
Florida Pebble,68% basis ton	...	1.90	1.85	1.90	...	1.85
70% basis ....ton	...	2.15	2.15	2.35	...	2.35
72% basis ....ton	...	2.40	2.40	2.85	...	2.85
75-74% basis ......ton	...	2.90	2.90	3.85	...	3.85
75% basis ....ton	...	5.50	...	5.50	...	5.50
Tennessee, 72% basis..ton	...	4.50	...	4.50	...	4.50
Phosphorus Oxychloride 175 lb cyl ....lb.	.15	.18	.15	.20	.16	.20
Red, 110 lb cases ......lb.	.40	.44	.40	.44	.40	.44
Sesquisulfide, 100 lb cs..lb.	.38	.42	.38	.44	.38	.44
Trichloride, cyl ....lb.	.15	.16	.15	.18	.15	.18
Yellow, 110 lb cs, wks lb.	.18	.20	.18	.20	.24	.30
Phthalic Anhydride, 100 lb drs, wks ....lb.	...	.14½	...	.14½	...	.14½
Pine Oil, 55 gal drs or bbls						
Destructive dist ....lb.	.53	.56	.53	.56	.46	.48
Steam dist wat wh bbls gal.	...	.59	...	.59	...	.59
tks ....gal.		54	...	.54	...	.54
Pitch Hardwood, wks ...ton	23.75	24.00	23.75	24.00	23.75	24.00
Coaltar, bbl, wks......ton		19.00		19.00		19 00
Burgundy, dom, bbls, wks lb.	.05½	.06½	.05½	.06½	.05½	.06½
Imported ....lb.	.15	.16	.15	.16	.15	.16
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls ....bbl.	6.00	6.50	6.00	6.50	6.00	6.25
Platinum, ref'd ....oz.	38.00	40.00	38.00	40.00	32.00	40.00
POTASH						
Potash, Caustic, wks, sol..lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
flake ....lb.	.07	.07⅜	.07	.07⅜	.07	.07⅜
liquid, tks ....lb.	...	.02⅞	...	.02⅞	...	.02⅞
Manure Salts, imported 30% basis, blk .....unit	...	.58½	...	.58½	...	.58½
Potassium Abietate, bbls ..lb	...	.09	...	.09	...	.09
Acetate, tech, bbls, delv lb.	...	.26	...	.26	...	.26
Bicarbonate, USP, 320 lb bbls ....lb.	...	.18	...	.18	...	.18
Bichromate Crystals, 725 lb cks* ....lb.	.08¾	.09¼	.08¾	.09¼	.08¾	.09¼
Binoxalate, 30 lb bbls ..lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs ...lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks ....lb.	.06½	.07	.06½	.07	.06½	.07
liquid, tks ....lb.	...	.02⅞	...	.02⅞	...	.02⅞
drs, wks ....lb.	.03	.03½	.03	.03½	.03	.03½
Chlorate crys, 112 lb kgs, wks ....lb.	.10½	.13	.10½	.13	.09¼	.13
gran, kgs ....lb.	.12	.14½	.12	.14½	.12	.14½
powd, kgs ....lb.	.10	.12½	.10	.12½	.08½	.12½
Chloride, crys, bbls ...lb.	.04	nom.	.04	.04¾	.04	.04¾
Chromate, kgs ....lb.	.24	.27	.24	.27	.19	.28
Cyanide, 110 lb cases...lb.	no prices		no prices		.50	.55
Iodide, 250 lb bbls .....lb.	...	1.35	...	1.35	1.13	1.35
Metabisulfite, 300 lb bbls lb.	.13	.15	.13	.15	.11	.18
Muriate, bgs, dom, blk unit	...	.53½	...	.53½	...	.53½
Oxalate, bbls ....lb.	.25	.26	.25	.26	.25	.26
Perchlorate, kgs, wks...lb.	.09½	.11	.09½	.11	.09	.10½
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.18½	.19	.18½	.19½	.18½	.19½
Prussiate, red, bbls ....lb.	.38	.45	.38	.45	.30½	.45
Yellow, bbls ....lb.	.15	.16	.15	.16	.14	.16
Sulfate, 90% basis, bgs ton	...	36.25	...	36.25	36.25	38.00
Titanium Oxalate, 200 lb bbls ....lb.	.40	.45	.40	.45	.35	.45
Pot & Mag Sulfate, 48% basis bgs ....ton	...	24.75	...	24.75	24.75	25.75
Propane, group 3, tks ...lb.	.03¾	.04	.03	.04⅜	.03	.04⅜
Putty, com'l, tubs ...100 lb.	...	3 15	...	6.00	3.00	6.00
Linseed Oil, kgs ...100 lb.	...	5.00	...	4.50	...	4.50
Pyrethrum, conc liq:						
2.4% pyrethrins, drs, frt all'd ....gal.	7.15	7.50	7.15	7.50	5.75	7.50
3.6% pyrethrins, drs, frt all'd ....gal.	10.65	11.00	10.65	11.00	8.45	11.00
Flowers, coarse, Japan, bgs ....lb.	.33	.36	.33	.36	.26	.36
Fine powd, bbls .....lb.	.35	.37	.35	.37	.27	.37
Pyridine, denat, 50 gal drs gal.	...	1.71	...	1.71	1.63	1.71
Refined, drs ....lb.	...	.51	...	.51	.50	.51
Pyrites, Spanish cif Atlantic ports, blk ....unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.40	2.15	...	2.15	2.75
Q						
Quebracho, 35% liq tks ..lb.	...	.03½	.03¼	.03½	.02⅞	.03⅜
450 lb bbls, c-l ......lb.	...	.03¾	...	.03¾	.04	.04⅛
Solid, 63%, 100 lb bales cif ....lb.	...	.04½	...	.04½	.04	.04½
Clarified, 64% bales .lb.	...	.04¾	...	.04¾	.04¼	.04¾
Quercitron, 51 deg liq, 450 lb bbls ....lb.	.08½	.09½	.08½	.09½	.07½	.08½
Solid, drs ....lb.	.11	.16½	.10	.16½	.10	.12
R						
R Salt, 250 lb bbls, wks lb.	...	.55	...	.55	...	.55
Resorcinol, tech, cans ...lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst .....lb.	.22¼	.23¼	.22¼	.23¼	.17¾	.21¾
Powd, bbls ....lb.	.21¾	.22¼	.21¾	.22¼	.16¾	.20¼
Rosin Oil, bbls, first run gal.	.45	.50	...	.50	.45	.47
Second run ....gal.	.51	.56	.52	.56	.47	.49
Third run, drs ....gal.	.52	.57	.56	.57	.51	.53
Rosins 600 lb bbls, 280 lb unit ex. yard NY:***						
B	...	6.20	5.90	6.20	4.60	5.45
D	...	6.20	5.90	6.20	4.95	5.70

* Spot price is ⅛c higher; *** March 2.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Rosins (continued)						
E	...	6.55	6.25	6.55	5.20	6.40
F	...	6.85	6.30	6.85	5.50	6.75
G	...	6.90	6.50	6.90	5.75	7.00
H	...	6.95	6.70	6.95	5.75	7.10
I	...	6.97½	6.75	6.97½	5.77½	7.20
K	...	7.00	6.85	7.00	5.80	7.20
M	...	7.02½	6.95	7.02½	5.90	7.25
N	...	7.05	6.95	7.05	6.75	7.40
WG	...	7.12½	7.05	7.12½	6.95	7.70
WW	...	7.60	...	7.60	7.45	8.50
Rosins, Gum, Savannah (280 lb unit):**						
B	...	4.80	4.00	4.80	3.25	4.00
D	...	4.80	4.10	4.80	3.55	4.30
E	...	5.15	4.82½	5.15	3.80	5.00
F	...	5.45	4.90	5.45	4.00	5.35
G	...	5.50	5.10	5.50	4.40	5.70
H	...	5.55	5.27½	5.55	4.40	5.70
I	...	5.57½	5.35	5.57½	4.40	5.80
K	...	5.60	5.45	5.60	4.40	5.80
M	...	5.62½	5.45	5.62½	4.40	5.85
N	...	5.65	5.55	5.65	5.10	6.00
WG	...	5.72½	5.65	5.72½	5.60	6.30
WW	...	6.20	...	6.20	5.60	7.10
X	...	6.20	...	6.20	6.05	7.10
Rosin, Wood, c-l, FF grade, NY	4.60	6.75	4.60	6.75	5.35	6.80
Rotten Stone, bgs mines ton	25.50	37.50	25.50	37.50	22.50	37.50
Imported, lump, bbls ... lb.	...	.14	...	.14	...	.14
Powdered, bbls ...... lb.	.08½	.10	.08½	.10	.08½	.10
S						
Sago Flour, 150 lb bgs .. lb.	.04	nom.	.04	.04½	.02½	.04½
Sal Soda, bbls wks ... 100 lb.	...	1.20	...	1.20	...	1.20
Salt Cake, 94-96%, c-l. bulk wks .... ton	...	17.00	...	17.00	19.00	25.00
Chrome, c-l, wks ...... ton	11.00	12.00	11.00	12.00	11.00	12.00
Saltpetre, gran, 450-500 lb bbls .... lb.	...	.071	...	.071	.06½	.069
Cryst, bbls .... lb.	...	.081	...	.081	.07½	.0865
Powd, bbls .... lb.	..	.081		.081	.07½	.079
Satin, White, pulp, 550 lb bbls .... lb.	.01¼	.01½	.01¼	.01½	.01¼	.01½
Schaeffer's Salt, kgs .... lb.	...	.46	.46	.48	.46	.48
Shellac, Bone dry, bbls .. lb. s	.25	.26	.25	.26	.18	.26
Garnet, bgs .... lb.	.22	.23	.19	.23	.12½	.20
Superfine bgs ...... lb. s	.17½	.20½	.17½	.20½	.10	.21
T. N., bgs .... lb. s	.16½	.19½	.16½	.19½	.09½	.20
Silver Nitrate, vials .... oz.	...	.26⅞	...	.26⅞	.26⅞	.33½
Slate Flour, bgs, wks ... ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks .... 100 lb.	...	1.10	...	1.10	...	1.10
58% light, bgs ..... 100 lb.	1.05	1.08	1.05	1.08	...	1.08
blk .... 100 lb.	...	.90	...	.90	...	.90
paper bgs .... 100 lb.	...	1.05	...	1.05	...	1.05
bbls .... 100 lbs.		1.35	...	1.35	...	1.35
Caustic, 76% grnd & flake, drs .... 100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs .... 100 lb.	...	2.30	...	2.30	2.10	2.30
Liquid sellers, tks ... 100 lb.	...	1.97½	...	1.97½	...	1.97½
Sodium Abietate, drs .... lb.	...	.11	...	.11	...	.11
Acetate, 60% tech, gran, powd, flake, 450 lb bbls wks .... lb.	.04	.05	.04	.05	.04	.05
anhyd, drs, delv ..... lb.	.08½	.10	.08¼	.10	...	.08¼
Alginate, drs .... lb.	.71	.95	.71	.95	.70	.95
Antimoniate, bbls ..... lb.	.14½	.15	.14½	.15	.11½	.16
Arsenate, drs .... lb.	.08	.08½	.08	.08½	.08	.08½
Arsenite, liq, drs .... gal.	...	.35	...	.35	.30	.35
Dry, gray, drs, wks .. lb.	.06½	.09¼	.06½	.09½	.07½	.09½
Benzoate, USP kgs ... lb.	.46	.48	.46	.48	.46	.48
Bicarb, powd, 400 lb bbl, wks .... 100 lb.	..	1.85	...	1.85	...	1.85
Bichromate, 500 lb cks, wks* .... lb.	.06⅞	.07¼	.06¾	.07¼	.06¾	.07¼
Bisulfite, 500 lb bbls, wks lb.	.03	.031	.03	.031	.031	.036
35-40% sol bbls, wks 100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
Chlorate, bgs, wks ..... lb.	.06¼	.08½	.06¼	.08½	.06¼	.07½
Cyanide, 96-98%, 100 & 250 lb drs, wks ..... lb.	.14	.15	.14	.15	.14	.15
Diacetate, 33-35% acid, bbls, lcl, delv ...... lb.	...	.09	...	.09	...	.09
Fluoride, white 90%, 300 lb bbls, wks .... lb.	.07½	.08	.07	.08	.07	.08¾
Hydrosulfite, 200 lb bbls, f.o.b. wks .... lb.	.16	.17	.16	.17	.16	.17
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	..	2.80	...	2.80	...	2.80
Tech, reg cryst, 375 lb bbls, wks ...... 100 lb.	2.45	2.80	2.45	2.80	2.45	2.80
Iodide, jars .... lb.	...	2.30	...	2.30	...	2.30
Metal, drs, 280 lbs .... lb.	...	.19	...	.19	.	.19
Metanilate, 150 lb bbls .. lb	.41	nom.	.41	.42	.41	.42
Metasilicate, gran, c-l, wks .... 100 lb.	...	2.35	...	2.35	2.20	2.35
cryst, drs, c-l, wks 100 lb.	...	3.05	...	3.05	2.90	3.05
Monohydrated, bbls ... lb.	...	.023	...	.023	...	.023
Naphthenate, drs ...... lb.	.12	.19	.12	.19	.12	.19
Naphthionate, 300 lb bbl lb.	...	.50	...	.50	.50	.54
Nitrate, 92% crude, 200 lb bgs, c-l, NY .... ton	...	28.30	...	28.30	..	28.30
	...	29.00	...	29.00	...	29.00
Bulk .... ton	...	27.00	...	27.00	...	27.00
Nitrite, 500 lb bbls .... lb.	.06¾	.11½	.06¾	.11½	.06¾	.11½

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; s T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. *Spot price is ⅛c higher.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Sodium (continued):						
Othochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25	.27	.25	.27	.25	.27
Orthosilicate, 300 lb drs, c-l ....lb.	...	3.00	...	3.00	...	3.00
Perborate, drs, 400 lb ..lb.	.14¾	.15¼	.14¾	.15¼	.14¾	.15¼
Peroxide, bbls, 400 lb ..lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2.30	...	2.30	2.05	2.30
bgs, wks ......100 lb.	...	2.10	...	2.10	1.85	2.10
Tri-sodium, tech, 325 lb. bbls, wks ......100 lb.	...	2.45	...	2.45	2.20	2.45
bgs, wks ......100 lb.	...	2.25	...	2.25	2.00	2.25
Picramate, 160 lb kgs..lb.	...	.65	.65	.67	.65	.67
Prussiate, Yellow, 350 lb. bbls, wks ....lb.	.09½	.09¾	.09½	.09¾	.09½	.10¾
Pyrophosphate, anhyd, 100 lb bbls f.o.b. wks frt eq lb.	...	.0530	...	.0530	...	.0530
Sesquisilicate, drs, c-l, wks ....100 lb.	...	2.90	...	2.90	2.80	2.90
Silicate, 60°, 55 gal drs, wks ....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 55 gal drs, wks 100 lb	...	.80	...	.80	...	.80
tks, wks ......100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY ....lb.	no prices		no prices		.03½	.04¾
Stannate, 100 lb drs ...lb.	no prices		no prices		.30	.35
Stearate, bbls ....lb.	.19	.24	.19	.24	.19	.24
Sulfanilate, 400 lb bbls lb.	.16	.18	.16	.18	.16	.18
Sulfate, Anhyd, 550 lb bgs c-l, wks ......100 lb. ‡	1.45	1.90	1.45	1.90	1.45	1.90
Sulfide, 80% cryst, 440 lb. bbls, wks ....lb.	.02¼	.03	.02¼	.03	.02¼	.02½
Solid, 650 lb drs, c-l, wks ....lb.	.03	.03¾	.03	.03¾	.03	.03½
Sulfite, cryst, 400 lb bbls, wks ....lb.	.023	.02½	.023	.02½	.023	.02½
Sulfocyanide, drs ......lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls....lb.	...	.12	...	.12	...	.12
Supersilicate (see sodium sesquisilicate)						
Tungstate, tech, crys, kgs lb.	no prices		no prices		1.05	1.10
Sorbitol, com, solut, wks c-l, drs, wks ....lb.	.15½	.16	.15½	.16	...	.15½
Spruce, Extract, ord, tks..lb.	...	.01⅛	...	.01⅛	...	.01⅛
Ordinary, bbls .....lb.	...	.01⅝	...	.01⅝	...	.01⅝
Super spruce ext, tks...lb.	...	.01⅜	...	.01⅜	...	.01⅜
Super spruce ext, bbls..lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext. powd, bgs ....lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	...	2.60	2.50	2.60	2.40	2.85
Powd, 140 lb bgs ...100 lb.	...	2.70	2.60	2.70	2.50	2.90
Potato, 200 lb bgs .....lb.	.06¼	...	.06¼	...	.04	.06¾
Imp, bgs ....lb.	...	.06½	...	.06½	.05	.06½
Rice, 200 lb bbls ......lb.	...	.07¼	...	.07¼	.06¼	.07¼
Sweet Potato, 240 lb bbls, f.o.b. plant ......100 lb.	5.50	6.00	5.50	6.00	5.50	7.50
Wheat, thick, bgs .....lb.	...	.05½	...	.05½	.05	.05½
Strontium, carbonate, 600 lb bbls, wks ....lb.	...	.23	.22	.23	.16	.24
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¼
Sucrose, octa-acetate, den, grd, bbls, wks ......lb.	...	.45	...	.45	...	.45
tech, bbls, wks ....lb.	...	.40	...	.40	...	.40
Sulfur, crude, f.o.b. mines ton	...	16.00	...	16.00	...	16.00
Flour, com'l, bgs ...100 lb.	1.60	1.95	1.60	2.35	1.65	2.35
bbls ....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs..100 lb.	...	2.00	2.00	2.80	2.20	2.80
bbls ....100 lb.	...	2.35	2.35	3.15	2.55	3.15
Extra fine, bgs .....100 lb.	...	2.85	2.85	3.00	2.85	3.00
Superfine, bgs .....100 lb.	2.65	2.80	2.65	2.80	2.65	2 80
bbls ....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ......100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls ....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs ....100 lb.	2.35	2.70	2.35	3.10	2.35	3.10
bbls ....100 lb.	2.85	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs, wks ....lb.	...	.03	.03	.04	.03	.04
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.07	.09
Multiple units, wks ....lb.	.04½	.07	.04½	.07	.04½	.07
tks, wks ....lb.	.04	.06	.04	.06	.04	.05
Refrigeration, cyl, wks lb.	.16	.17	.16	.17	.16	.17
Multiple units, wks ...lb.	.07½	.10	.07½	.10	.07½	.10
Sulfuryl Chloride ....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd .....ton	...	100.00	98.00	100.00	65.50	85.00
Extract, 42°, bbls .....lb.	...	.06	...	.06	.05¼	.06¼
Superphosphate, 16% bulk, wks ....ton	...	9.00	...	9.00	8.00	9.00
Run of pile ....ton	...	8.50	...	8.50	7.50	8.50
Triple, 40-48%, a.p.a. bulk, wks, Balt. unit .....ton	...	.70	...	.70	...	.70
Talc, Crude, 100 lb bgs, NY ton	14.00	15.00	14.00	15.00	13.00	15.00
Ref'd 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	16.00
French, 220 lb bgs, NY ton	23.00	30.00	23.00	30.00	23.00	30.00
Ref'd, white bgs, NY ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	64.00	67.00	64.00	70.00	60.00	70.00
Ref'd', white bgs, NY ton	65.00	70.00	65.00	70.00	65.00	70.00
Tankage, Grd, NY ...unit ¤	...	3.10	3.10	3.25	2.75	3.25
Ungrd ....unit ¤	...	3.10	3.10	3.25	2.75	5.00
Fert grade, f.o.b.Chgo unit ¤	...	3.35	3.35	3.50	2.50	4.50
South American cif unit ¤	...	3.35	3.35	3.50	3.00	4.00
Tapioca Flour, high grade, bgs ....lb.	.02¾	.04½	.02¾	.04½	.01¾	.05½
Tar Acid Oil, 15%, drs..gal.	.22	.24	.22	.24	.21	.24
25% drs ....gal.	.26	.28	.26	.28	.25	.28
Tar, pine, delv, drs .....gal.	.26	.27	.26	.27	.25	.27
tks, delv, E. cities ....gal.	...	.21	...	.21	.20	.21
Tartar Emetic, tech, bbls lb.	.34¾	nom.	.34¾	.35	.27¾	.35
USP, bbls ....lb.	.40	nom.	...	.40	.33	.40

‡ Bags 15c lower; ¤ + 10.

	Current	Market	1940 Low	1940 High	1939 Low	1939 High
Terpineol, den grade, drs lb.	...	.17	...	.17	...	.17
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachlorethylene, drs, tech lb.	.08	.09½	.08	.09½	...	.09½
Tetralene 50 gal drs, wks lb.	...	.12	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbls lb.	...	.24	.20	.25	.20	.25
Tin, crystals, 500 lb bbls, wks lb.	...	.37	.36	.37	.35½	.39
Metal, NY ....lb.	...	.47½	.45½	.47½	.45½	.60
Oxide, 300 lb bbls, wks lb.	.51	.53	.51	.53	.50	.54
Tetrachloride, 100 lb drs, wks ....lb.	...	.23¾	.23	.24¾	.23	.32
Titanium Dioxide, 300 lb bbls lb.	.13	.16	.13	16	.13¼	.16
Barium Pigment, bbls ..lb.	.05¼	.06½	.05¼	.06½	.05⅝	.06½
Calcium Pigment, bbls lb.	...	.05	...	.05	.05⅜	.06½
Toluidine, mixed, 900 lb drs, wks ....lb.	...	.26	.26	.27	.26	.27
Toluol, 110 gal drs, wks gal.	...	.30	.27	.30	...	.27
8000 gal tks, frt all'd gal.	...	.25	.22	.25		.22
Toner Lithol, red, bbls..lb.	.55	.60	.55	.60	.55	.80
Para, red, bbls ....lb.	.70	.75	.70	.75	.70	.80
Toluidine, bgs ....lb.	...	1.20	1.20	1.35	...	1.35
Triacetin, 50 gal drs, wks, lb.	...	.26	...	.26	...	.26
Triamyl Borate, lcl, drs, wks lb.	...	.27	...	.27		.27
Triamylamine, c-l, drs, wks lb.	...	.77	...	.77	.77	1.25
lcl, wks, drs ....lb.	.78	.80	.78	.80	...	...
tks, wks ....lb.		.75		.75	...	
Tributylamine, lcl, drs, wks lb.	.68	.70	.68	.70	...	.70
c-l, drs, wks ....lb	...	.67	...	.67	...	...
tks, wks ....lb.	...	.65	..	.65		
Tributyl citrate, drs. frt all'd lb.	...	.35	...	.35	.35	.45
Tributyl Phosphate, frt all'd lb.	...	.42	...	.42	...	.42
Trichlorethylene, 600 lb drs, frt all'd E. Rocky Mts lb.	.08	.09	.08	.09	.08	.09½
Tricresyl phosphate, tech. drs, lb.	.22	.36½	.22	.36½	.22	.37½
Triethanolamine, 50 gal drs wks ....lb.	...	.19	.19	.22	.21	.22
tks, wks ....lb.	...	.18	.18	.20	...	.20
Triethylamine, lcl, drs, f.o.b. wks ....lb.	...	1.05	...	1.05	...	
Triethylene glycol, drs, wks lb.	...	.26	...	.26	...	.26
Trihydroxyethylamine Oleate, bbls ....lb.	...	.30	...	.30	...	.30
Stearate bbls ....lb.	...	.30	...	.30	...	.30
Trimethyl Phosphate, drs, lcl, f.o.b. dest ....lb.	...	.50	...	.50	...	.50
Trimethylamine, c-l, drs, frt all'd E. Mississippi ...lb.	...	1.00	...	1.00	...	1.00
Triphenylguanidine, ...lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs lb.	...	.38	...	.38	...	.38
Tripoli, airfloated, bgs, wks ton	...	26.00	26.00	30.00	26.00	30.00
Turpentine (Spirits), c-l, NY dock, bbls ....gal.	...	.38½**	.33¾	.40	.29	.35
Savannah, bbls ....gal.	...	.32½*	.27¾	.34	.23½	.29
Jacksonville, bbls ......gal.	...	.34¾*	.26	.34¾	.23½	.26¾
Wood Steam dist, drs, c-l, NY ....gal.	...	.33	.33	.34½	.242	.34
Wood, dest dist, c-l, drs, delv E. cities ......gal.	.29	.31	.23	.31	.22	.25
U						
Urea, pure 112 lb cases lb.	...	.13	.13	.15½	.14½	.15½
Fert grade, bgs, c. i. f. S.A. points ....ton	95.00	101.00	95.00	110.00	95.00	110.00
Dom f.o.b., wks ......ton	95.00	101.00	95.00	101.00	95.00	101.00
Urea Ammonia, liq., nitrogen basis ....ton	...	121.58	..	121.58	...	...
V						
Valonia beard, 42%, tannin bgs ....ton	...	48.00	48.00	54.00	45.00	57.00
Cups, 32% tannin bgs..ton	36.00	38.00	33.00	38.00	27.00	39.00
Extract, powd, 63% ...lb.	.0565	nom.	.0565	.06	.05	.06
Vanillin, ex eugenol, 25 lb tins, 2000 lb lots ....lb.	...	2.60	...	2.60	2.20	2.60
Ex-guaiacol ....lb.	...	2.50	...	2.50	2.10	2.50
Ex-lignin ....lb.	...	2.50	...	2.50	2.10	2.50
Vermilion, English, kgs...lb.	no prices		...	2.76	1.50	2.97
W						
Wattle Bark, bgs ....ton	37.50	38.75	36.50	38.75	34.50	40.00
Extract, 60°, tks, bbls..lb.	...	.04¼	...	.04¼	.04	.05½
Wax, Bayberry, bgs ......lb.	.25	.26	.25	.30	.16⅞	.39
Bees, bleached, white 500 lb slabs, cases ......lb.	...	.38	...	.38	.33	.40½
Yellow, African, bgs..lb.	.26½	.27	.26½	.28	.18½	.30
Brazilian, bgs ......lb.	.27	.27½	.27	.29	.21	.33
Refined, 500 lb slabs, cases lb.	.31	.36	.31	.36	.25½	.36
Candelilla, bgs ....lb.	.18	.18½	.18	.19	.15¼	.19
Carnauba, No. 1, yellow, bgs ....lb.	.74	.75	.69	.75	.36¾	.78
No. 2, yellow, bgs...lb.	.72	.73	.68	.73	.35¾	.45
No. 2, N. C., bgs ...lb.	.56	.57	.46	.57	.34	.41
No. 3, Chalky, bgs ...lb.	.46	.47	.43	.47	.27½	.46
No. 3, N. C., bgs ...lb.	.51	.52	.47	.52	.28¾	.49
Ceresin, dom, bgs ......lb.	.11½	.12	.11½	.15	.08½	.15
Japan, 224 lb cases ....lb.	.15½	.16	.15½	.16½	.09¾	.18
Montan, crude, bgs ....lb.	no prices		no prices		.11	.11¾
Paraffin, see Paraffin Wax,						
Spermaceti, blocks, cases lb.	.23	.24	.23	.25	.18	.25
Cakes, cases ....lb.	.24	.25	.24	.25	.19	.26
Whiting, chalk, com 200 lb bgs, c-l, wks ......ton	16.00	20.00	12.00	20.00	12.00	14.00
Gilders, bgs, c-l, wks..ton	...	18.00	15.00	18.00	.	15.00
Wood Flour, c-l, bgs ....ton	...	25.00	20.00	30.00	20.00	30.00
Xylol, frt all'd, East 10° tks, wks ....gal.	...	.30	...	.30	.29	.30
Com'l tks, wks, frt all'd, gal	...	.27	...	.27	.26	.27
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.35	.36
Zein, bgs, 1000 lb lots, wks ....lb.	...	.20	...	.20	...	...

* Feb. 29. ** Mar. 3.

Current

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Zinc Acetate, tech, bbls, lcl, delv ... lb.	.15	.16	.15	.16	.15	.21
Arsenite, bgs, frt all'd . lb.	..	.12	.12	.12½	.12	.13
Carbonate tech, bbls, NY lb.	.14	.16	.14	.16	.14	.15
Chloride fused, 600 lb drs, wks ... lb.	...	.04¼	.04¼	.046	.04¼	.046
Gran, 500 lb drs, wks lb.	...	.05	.05	.05¾	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.25	...	2.25	...	2.25
Cyanide, 100 lb drs ... lb.	...	.33	...	.33	...	.33
Dust, 500 lb bbls, c-l, delv lb.	...	.07¾	.07½	.07¾	.06½	.08½
Metal, high grade slabs, c-l, NY ... 100 lb.	...	6.14	5.90	6.14	4.84	6.40
E. St. Louis ... 100 lb.	...	5.75	4.60	5.75	4.60	6.00
Oxide, Amer, bgs, wks lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
French 300 lb bbls, wks lb.	.06½	.07¼	.06½	.07¾	.06½	.07¾
Palmitate, bbls ... lb.	.24½	.27½	.23	.27½	.23	.25
Resinate, fused, pale bbls lb.	...	.10	...	.10	...	.10
Stearate, 50 lb bbls ... lb.	...	.23	.21½	.24½	.20	.24½
Sulfate, crys, 400 lb. bbls wks ... lb.	...	.029	...	.029	...	.029
Flake, bbls ... lb.	...	.0325	...	.0325	...	.0325
Sulfide, 500 lb bbls, delv lb.	...	.07¾	.07¾	.08	.07¾	.08⅞
bgs, delv ... lb.	...	.07½	.07½	.07¾	.07½	.08⅝
Sulfocarbolate, 100 lb kgs lb.	.24	.26	.24	.26	.24	.26
Zirconium Oxide, crude, 73-75% grd, bbls, wks ton	75.00	100.00	75.00	100.00	75.00	100.00

Oils and Fats

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Babassu, tks, futures ... lb.	...	.06⅜	.06¼	.06⅝	.05⅞	.07⅝
Castor, No. 3, 400 lb drs lb.	...	.12¾	...	.12¾	.08¼	.12¾
Blown, 400 lb drs ... lb.	...	.14¾	...	.14¾	.10¼	.14¾
China Wood, drs, spot NY lb.	.27	.28	.27	.28	.15	.28
Tks, spot NY ... lb.	.26	.27	.26	.27	.14½	.27
Coconut, edible, drs NY . lb.	.08⅝	...	.08⅝	.09⅜	.08⅛	.10⅛
Manila, tks, NY ... lb.	...	.03⅜	.03⅜	.03¼	.02⅞	.04⅝
Tks, Pacific Coast ... lb.	...	.03½	...	.03½	.02⅝	.04⅜
Cod, Newfoundland, 50 gal bbls ... gal.	...	.72	...	.72	.29	.72
Copra, bgs, NY ... lb.	...	.0185	.0180	.0185	.0160	.2625
Corn, crude, tks, mills ... lb.	.06¼	.06⅜	.06⅛	.06⅜	.05⅛	.07⅛
Refd, 375 lb bbls, NY lb.	.08⅝	.08⅞	.08½	.08⅞	.07½	.09¾
Degras, American, 50 gal bbls NY ... lb.	.09	.10	.09	.10	.07	.10
English, bbls, NY ... lb.	.09	.10	.09	.10	.07	.10
Greases, Yellow ... lb.	.05	.05⅛	.05	.05¼	.03⅞	.06¾
White, choice, bbls, NY lb.	.05⅜	.05½	.05⅜	.05⅝	.04½	.07½
Lard, Oil, edible, prime . lb.	...	.10	...	.10	.09	.11¼
Extra, bbls ... lb.	...	.09	.09	.09⅜	.08	.10⅜
Extra, No. 1, bbls ... lb.	...	.08⅞	...	.08⅞	.07¾	.10⅛
Linseed, Raw less than 5 bbl lots ... lb.	.110	.111	.110	.111	.092	.119
bbls, c-l, spot ... lb.	.102	.105	.102	.105	.084	.111
Tks ... lb.	.096	.099	.096	.099	.078	.104
Menhaden, tks, Baltimore gal.	...	.35	...	.35	.21	.35
Refined, alkali, drs ... lb.	.071	.081	.071	.081	.062	.082
Tks ... lb.	...	.069	...	.069	.056	.076
Kettle bodied, drs ... lb.	...	.093	...	.093	.074	.094
Light pressed, drs ... lb.	...	.075	...	.075	.056	.076
Tks ... lb.	...	.069	...	.069	.067	.069
Neatsfoot, CT, 20°, bbls, NY lb.	...	.19¼	...	.19¼	.14¾	.19¾
Extra, bbls, NY ... lb.	...	.09	...	.09	.08	.10⅛
Pure, bbls, NY ... lb.	...	.14¼	...	.14¼	.10¾	.16¾
Oiticica, bbls ... lb.	.19	.21	.19	.21	.09¼	.21
Oleo, No. 1, bbls, NY ... lb.	...	.07¾	...	.07¾	.07¼	.12
No. 2, bbls, NY ... lb.	...	.07½	...	.07½	.06¾	.11¾
Olive, denat, bbls, NY . gal.	.96	.98	.95	.98	.82	1.40
Edible, bbls, NY ... gal.	...	2.00	...	2.00	1.75	2.25
Foots, bbls, NY ... lb.	.08	.08⅛	.08	.08½	.06¾	.10
Palm, Kernel, bulk ... lb.	no prices		no prices		.034	.036
Niger, cks ... lb.	.04⅜	.05½	.04⅜	.05½	.03⅝	.05½
Sumatra, tks ... lb.	.03	nom.	.03	nom.	.0265	.02¾
Peanut, crude, bbls, NY lb.	.07¼	.07⅜	.06¾	.07⅜	.06	.08
Tks, f.o.b. mill ... lb.	.07	.07⅛	.06½	.07⅛	.05¼	.07¼
Refined, bbls, NY ... lb.	.09½	.09¾	.09½	.09¾	.08¾	.10¾
Perilla, drs, NY ... lb.	.21	nom.	.19	.21	.09½	.16½
Tks, Coast ... lb.	20	nom.	.18½	.20	.089	.15¾
Pine, see Pine Oil, Chem. Sec.						
Rapeseed, blown, bbls, NY lb.	.17	.17½	.17	.17½	.14	.17½
Denatured, drs, NY . gal.	1.00	1.05	1.00	1.05	.80	1.05
Red, Distilled, bbls ... lb.	.08½	.09½	.08½	.09½	.06¾	.09½
Tks ... lb.	...	.08	...	.08	.064	.08½
Sardine, Pac Coast, tks . gal.	...	.39	.37	.39	.24	.38
Refined alkali, drs ... lb.	...	.081	...	.081	.062	.082
Tks ... lb.	...	.075	...	.075	.056	.076
Light pressed, drs ... lb.	...	.075	...	.075	.056	.076
Tks ... lb.	...	.069	...	.069	.05	.07
Sesame, yellow, dom ... lb.	.11½	.11¾	.11½	.11¾	.09	.12
White, dom ... lb.	.11½	.11¾	.11½	.11¾	.09	.12
Soy Bean, crude						
Dom, tks, f.o.b. mills lb.	.06¼	.06⅜	.06	.06¼	.04½	.06½
Crude, drs, NY ... lb.	.06⅞	.07¾	.06⅝	.07¾	.05⅛	.07⅝
Ref'd, drs, NY ... lb.	.08¼	.08⅞	.08	.08½	.06⅜	.09
Tks ... lb.	.07½	.07⅝	...	.07⅝	.05¾	.07¾
Sperm, 38° CT, bleached bbls, NY ... lb.	...	.103	...	.103	.09	.103
45° CT, blchd, bbls, NY, .. lb.	...	.096	...	.096	.083	.096
Stearic Acid, double pressed dist bgs ... lb.	.12	.13	.12	.13	.10	.13½
Double pressed saponified bgs ... lb.	.12¾	.13¾	.12¾	.13¾	.10¼	.13¾
Triple pressed dist bgs lb.	.15½	.16½	.15½	.16½	.12¾	.16½
Stearine, Oleo, bbls ... lb.	.06¼	.06½	.06¼	.06½	.05½	.12
Tallow City, extra loose . lb.	...	.05⅛	.05¼	.05⅜	.04⅜	.07
Edible, tierces ... lb.	...	.05⅝	.05⅝	.05¾	.04½	.07¾
Acidless, tks, NY ... lb.	...	.08	...	.08	.07	.09¼
Turkey Red, single, drs . lb.	...	.09	...	.09	.06	.08⅝
Double, bbls ... lb.	.11¾	.12¾	.11¾	.12¾	.08¾	.11¼
Whale:						
Winter bleach, bbls, NY lb.	...	095	...	.095	.075	.095
Refined, nat, bbls, NY . lb.	...	.091	...	.091	.071	.091

PROFESSIONAL DIRECTORY

New Products

An Unusual Patent

According to the United States Patent Office, one of the most unusual patents of 1939 was the one granted to Errol B. Shang, of Corning, N. Y. The patent is for a lamp wick that does not burn out. It is made of woven glass fibers coated with a phenol resin which is said to make the wick more porous and prevents the heat of the flame from melting the fibers. Mr. Shang is superintendent of the estimating and developing department of Corning Glass Works.

Emulsifying Agent

"Duponol" G, a new alcohol sulfate emulsifying agent derived from lauryl alcohol has recently been announced. It is a translucent amber colored paste to be added to the oil phase for preparation of emulsions. "Duponol" forms limpid solutions with mineral and vegetable oils in the presence of "soluble" oils, according to the maker.

New Color

A new chrome color, "Pontachrome" Orange RL, is now available. It possesses very good fastness to light and for that reason will be of primary interest as a shading color to produce mode shades on automotive upholstery, uniform cloth and other fabrics requiring the best possible light fastness. The color is very fast to carbonizing, a desirable characteristic in a chrome color. Steaming, perspiration, washing and fulling have very little, if any, effect upon the shade.

Acrawax B

The use of this recently developed wax as a flattening agent for paints, enamels and varnishes is said to be an improvement over the commonly used metallic soaps or carnauba wax. Aging tests indicate no variation in the paint film containing Acrawax B, nor has any separation or granulation been observed; ready solubility in solvents giving stable, homogeneous solutions on cooling being a unique property of this wax. Acrawax B is light brown in color, is one of the ester type and has a melting point of 86-88° C. It blends well with other resins and waxes and is soluble in mineral oil. In addition to use as a flattening agent, it is recommended in various types of polished wax emulsions, dental waxes, recording waxes, molding waxes and special wax combinations.

Textile Softener

Another new textile softener, "Avitex" L, has high lubricating properties and essentially complete rinsability from textile fibers. It is a viscous, brownish, oil-like product which disperses to form clear type emulsions in water. It is soluble in the presence of high concentrations of salts such as sodium chloride, Glauber's salt and Epsom salt and is resistant to high degrees of hardness in water. It is highly stable in solution on prolonged boiling. "Avitex" L is recommended for use where a well lubricated finish is required on fabrics or yarns. It increases the absorbency of textile fibers, making it effective for finishing fabrics to be sanforized and it has a pronounced anti-static effect on staple viscose fibers, according to the company.

Glues and Gelatines

During the past five or six years the Italian glue and gelatine industry has made considerable progress. New methods have been worked out for the continuous splitting of bone grease and allied products. These developments were described in some detail by Dr. Rastelli to the Tenth International Chemistry Congress held in Rome, the substance of Dr. Rastelli's paper being now published in "L'Industrie Chimique" of December, 1939.

The method for the continuous splitting of bone grease referred to above has been developed by Curletti and Martini of the Montecatini Company, and consists of passing a neutral emulsion of the grease in water in the presence of an appropriate catalyst through a copper coil, the length of the coil and other conditions being so chosen that the product leaving the coil is a mixture of fatty acid and glycerine lye, the degree of splitting being over 95%.

Two new plants also belonging to the Montecatini Company have been constructed for the splitting of bone grease by the autoclave process, and have proved economical in use, despite the comparatively low content of glycerine in the raw material. Benzine, which was originally used exclusively for bone degreasing in Italy, is rapidly being replaced by trichlorethylene. The Montecatini Group has also restarted and amplified the production of edible, therapeutic and photographic gelatine by the demineralization of bones with hydrochloric acid. *Chem. Trade Jour. and Chem. Eng.*, Feb. 9, 1940.

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1—Shriver 42" x 42" Castiron Filter Press, plate and frame, 30 chambers.
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Index to Advertisers

Index to Advertisers

"We"—Editorially Speaking

Just ten years ago a paper was delivered before a meeting of the American Institute of Mining and Metallurgical Engineers advocating a United States Court of Patent Appeals consisting of five judges, three attorneys and two technical experts familiar with the problems involved. Which proves again the old adage "There is nothing new under the sun."

Speaking of patents—next month marks the 150th anniversary of the founding of the patent system in the United States and to celebrate the occasion we will publish "The International Patent Situation," written by that internationally known consulting chemist and patent attorney, Dr. Armand E. Mestern. You will find most interesting and instructive his review of the actions taken by the various belligerent countries on the question of enemy patents.

We felt that publishing Mr. Bell's and Dr. Williams' articles on the subject "The Executive and the Technologist" was simply a "must" for this issue and we are confident that all of our readers will agree in this instance with our judgment. Our only regret is that it forced the postponed publication of I. D. Hagar's splendid article, "The Titanium Pigments," also Williams Haynes' latest "Chemical Pioneers" article "The Founder of Du Pont," Both will appear in the April issue without fail.

Which brings us to further "inside" news about our April number. E. R. Coyle of the Neville Company will discuss the "Paracoumarone-Indene Resins"; Dr. C. A. Tyler will tell you "What Specialties Do the Chains Buy"; and, of course, Part 2 of James H. Critchett's absorbing story "Twenty Years of Alloy Steel."

Mr. Critchett, vice-president of Electro Metallurgical Company, was born in Watertown, Mass., on July 27, 1886, and is an outstanding product of M.I.T. ('09). His first connection was with Illinois Steel, later joining the staff of Buchanan Electric Steel Co. He was with Hooker Electrochemical for two years, 1912-'14, and has been with Electro Metallurgical since '14. He has authored many articles on various phases of metallurgy and welding. Mr. Critchett was president of the Electrochemical Society in 1935-'36. He married Ruth Walton of Newtonville, Mass., in 1910, and is the father of two very charming daughters. Mr. Critchett resides at Douglas Manor, Douglaston, N. Y., and occasionally in the summer months steals away for a few days of well-earned rest at his Cape Cod cottage. His hobbies are woodworking, carving, and farming.

"We" would be greatly remiss in our plain duty if we did not add a word of sincere thanks and appreciation to Dr. Frederick M. Becket, consultant of the Union Carbide and Carbon Corporation, and a member of our Consulting Board of Editors, for his fine cooperation in obtaining for us the splendid photographs that illustrate Mr. Critchett's article.

Which reminds us that the Chemists' Club (N. Y.) membership is to be congratulated on the recent action of its nominating committee in nominating Dr. Becket for reelection as president of the Club. Although a technologist, he fearlessly "stormed" the "Low Round-Table" and immediately registered a complete victory. To a man the "Chemical Peddlers" love him. More often than necessary, it seems to us, the points of view of the technologist on the one hand and the salesman and sales executive on the other, are miles apart. Dr. Becket is a potent force in bringing these divergent points of view closer together.

Jerome Klein, chef of the Chemists' Club for the past 29 years, has passed on. Heaven is richer by his presence, but we are made poorer through his untimely death. We like to think that he has found a spot close to Egan. We do not know how many friendships at the Club have been more closely cemented during those many years because of the delicious repasts he lovingly prepared, but God does, and that is really all that counts. He was a "big business man"—many a sale, many a contract, resulted from his faithful toil amid his pots and pans.

The Packaging, Shipping and Container minded will find much valuable information in the "Shipping and Container Forum" of Richard W. Lahey, well-known packaging expert. The page number is 357.

In line with our avowed purpose of rendering unusual services for the readers of Chemical Industries, we will introduce in our April issue "The Foreign Literature Digest" column, conducted by T. E. R. Singer, former librarian in the chemical room of the New York Public Library, and now a consultant. Each month he will report on new products, new processes, etc., discussed in all of the leading foreign technical journals. Like the patent service the time element involved will appeal particularly to the busy executive.

Did you know that:—

Current plastics production in the U. S. is estimated to be in excess of 160,000,000 lbs. a year and plastic articles are being put to literally thousands of uses ranging from false teeth to airplane parts.

The automobile industry is the largest buyer of plastics, and women second.

Fifteen Years Ago

From our files of March, 1925.

An American manufacturer announces production on broad scale of synthetic menthol.

The United States Government wins appeal in the Supreme Court against Butterworth-Judson Corp. and others growing out of a war contract for manufacture of picric acid.

The Drug & Chemical Club, New York, will lease the 13th and 14th floors of a new building to be erected at John, Gold, and Platt sts.

Under the command of a corps of chemists and engineers, work is being rushed to equip the "Lake Harminia" with complete apparatus for the chlorination of sea water in order to recover bromine.

Gen. Amos A. Fries, Chief of the Chemical Warfare Service, will be the main speaker at the monthly meeting and dinner of the Salesmen's Association of the American Chemical Industry. Subject: "Chemicals in Warfare."

American Smelting and Refining Co. shows net earnings for 1924 of $21,471,506. Net income after all deductions was $11,186,000 or $12.60 a share.

Pine Institute of America will be the name of an association of naval stores interests. Its object is to gather information for the industry.

Charges that a fertilizer trust exists in the South are being investigated by the Federal Trade Commission and Department of Justice.

Dr. Morris Fishbein will be one of the speakers at 14th annual meeting of American Drug Manufacturers Association. Topic: "Trends in Therapeutic Research."

Columbia University will hereafter take over patents for discoveries made in its research laboratories.

The German Dye Cartel exported nearly 80% of its production before the war and now exports 40%.

The recent importation of large quantities of synthetic methanol throws a scare into the big wood chemical producers.

VOL. 46 · Mar. '40

CHEMICAL INDUSTRIES

Statistical and Technical Data Section

No. 3 · Part 2

State of Chemical Trade

Current Statistics (February 29, 1940)—p. 53

WEEKLY STATISTICS OF BUSINESS

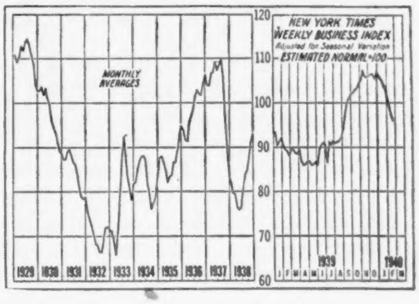
Week Ending	Carloadings 1940	Carloadings 1939	Carloadings % of Change	Electrical Output* 1940	Electrical Output* 1939	Electrical Output* % of Change	Jour. of Com. Price Index	Nat'l Chem. & Drugs	Fertilizer Fats & Oils	Ass'n Price Indices Fert. Mat.	Ass'n Price Indices Mixed Fert.	Ass'n Price Indices All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher Commodity Index
Feb. 3	657,004	573,127	+14.6	2,541,358	2,287,248	+11.1	81.2	94.3	53.0	73.6	78.3	77.5	77.5	77.3	101.5	84.7
Feb. 10	626,903	576,352	+ 8.8	2,522,514	2,268,387	+11.2	81.4	94.3	53.5	73.3	78.3	77.4	77.3	71.7	98.6	84.6
Feb. 17	607,924	576,645	+ 5.4	2,475,574	2,248,767	+10.1	81.5	94.3	53.1	73.3	78.7	77.4	77.5	67.1	96.6	84.3
Feb. 24	595,032	556,742	+ 6.9	2,455,285	2,225,690	+10.3	80.8	94.3	53.1	73.2	78.7	77.4	77.7	65.9	96.1	84.8

* K.W.H. 000 omitted; † 1926-1928 = 100.00.

MONTHLY STATISTICS

CHEMICAL:	Jan. 1940	Jan. 1939	Dec. 1939	Dec. 1938	Nov. 1939	Nov. 1938
Acid, sulfuric (expressed as 50° Baumé, short tons, Bureau of the Census)						
Total prod. by fert. mfrs.	......	181,386	219,838	176,823	208,461	171,106
Consumpt. in mfr. fert.	......	142,451	172,332	148,289	176,860	147,592
Stocks end of month	......	92,850	83,814	90,089	74,027	87,331
Alcohol, Industrial (Bureau Internal Revenue)						
Ethyl alcohol prod., proof gal.	20,655,547	17,067,004	22,080,109	16,780,614	21,786,753	15,163,858
Comp. denat. prod., wine gal.	1,303,991	474,140	655,916	2,105,460	2,838,893	2,826,942
Removed, wine gal.	1,318,113	444,784	675,899	2,109,668	2,900,234	2,989,276
Stocks end of mo., wine gal.	287,163	455,271	304,976	426,639	350,954	433,186
Spec. denat. prod., wine gal.	9,063,786	6,352,405	10,502,486	8,372,981	10,221,280	7,359,401
Removed, wine gal.	8,828,451	6,276,747	10,758,595	8,323,920	10,168,118	7,319,214
Stocks end of mo., wine gal.	1,129,653	923,449	868,494	851,887	1,128,342	799,478
Ammonia sulfate prod., tons *a*	60,393	45,756.5	60,454.5	45,837	59,745	44,985
Benzol prod., gal. *b*	11,424,000	7,788,000	11,536,000	7,802,000	11,230,000	7,619,000
Byproduct coke, prod., tons *a*	4,707,068	3,366,956	4,718,197	3,362,845	4,566,573	3,277,523
Cellulose Plastic Products (Bureau of the Census)						
Nitrocellulose sheets, prod., lbs.	878,316	641,575	750,269	543,797	982,732	773,450
Sheets, ship., lbs.	749,002	685,139	830,164	674,069	861,442	675,716
Rods, prod., lbs.	291,806	233,530	283,258	187,926	286,736	174,270
Rods, ship., lbs.	275,316	220,464	298,140	201,074	295,438	266,944
Tubes, prod., lbs.	68,702	48,284	55,358	57,695	91,391	70,001
Tubes, ship., lbs.	58,805	50,809	70,356	61,942	86,820	65,573
Cellulose acetate, sheets, rod, tubes						
Production, lbs.	857,277	896,122	987,017	1,111,639	725,119	1,331,717
Shipments, lbs.	751,429	855,778	1,029,572	1,031,652	793,028	1,250,528
Molding comp., ship.; lbs.	1,023,808	682,482	1,135,205	671,160	1,119,050	955,591
Methanol (Bureau of the Census)						
Production, crude, gals.	457,271	351,814	434,021	357,249	479,622	344,328
Production, synthetic, gals.	3,452,677	2,462,884	4,184,479	2,844,249	4,611,707	2,617,979
Pyroxylin-Coated Textiles (Bureau of the Census)						
Light goods, ship., linear yds.	2,909,785	2,637,337	2,867,168	2,711,664	3,351,950	2,524,908
Heavy goods, ship., linear yds.	2,151,034	2,147,444	2,280,890	1,839,537	2,204,021	1,643,259
Pyroxylin spreads, lbs. *c*	2,131,394	5,270,462	5,038,160	8,692,244	5,413,300	4,288,697
Exports (Bureau of Foreign & Dom. Commerce)						
Chemicals and related prod. *d*	......	$8,984	$23,102	$13,525	$19,321	$12,613
Crude sulfur *d*	$1,001	$555	$1,139	$666	$777	$600
Coal-tar chemicals *d*	$2,895	$1,015	$1,802	$1,032	$1,813	$817
Industrial chemicals *d*	$4,189	$1,770	$5,047	$2,065	$4,464	$2,093
Imports						
Chemicals and related prod. *d*	......	$6,742	$6,762	$6,729	$14,000	$13,716
Coal-tar chemicals *d*	$1,182	$1,817	$1,307	$1,188	$1,567	$1,917
Industrial chemicals *d*	$1,408	$1,120	$1,556	$1,293	$1,465	$1,295
Employment (U. S. Dept. of Labor, 3 year av., 1923-25 = 100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	120.9	113.2	122.3	114.3	122.2	114.6
Other than petroleum	120.7	112.0	122.2	113.3	121.8	113.2
Chemicals	135.9	117.5	137.4	119.0	137.6	119.3
Explosives	103.5	85.6	107.8	86.3	106.6	86.4
Payrolls (U. S. Dept. of Labor, 3 year av., 1923-25 = 100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	131.0	118.8	133.3	119.3	133.0	118.3
Other than petroleum	130.4	113.9	132.0	114.7	131.5	113.5
Chemicals	160.3	130.2	162.1	132.2	161.5	130.4
Explosives	120.9	95.1	128.7	99.7	128.9	96.1
Price index chemicals	80.9	79.7	81.1	80.0	81.4	80.2
Chem. and drugs	78.1	76.7	78.1	76.7	78.0	76.6
Fert. mat.	74.0	70.2	74.5	68.6	73.0	67.7
Paint and paint mat.	87.2	......	85.5	81.0	84.9	80.9
FERTILIZER:						
Exports (long tons, Nat. Fert. Association)						
Fertilizer and fert. materials	......	85,542	......	133,295	......	147,587
Ammonium sulfate	......	2,096	......	2,482	......	4,494
Total phosphate rock	......	68,897	......	91,350	......	107,760
Total potash fertilizers	......	2,144	......	3,945	......	3,080
Imports (long tons, Nat. Fert. Association)						
Fertilizer and fert. materials	......	145,995	......	146,937	......	114,164
Ammonium sulfate	......	7,611	......	12,547	......	9,677
Sodium nitrate	......	68,854	......	32,336	......	4,851
Total potash fertilizer	......	20,186	......	66,897	......	58,730

INDUSTRIAL TRENDS



Business: In January and the first half of February industrial activity continued the decline from the high level reached in the latter part of 1939. Toward the end of February activity showed only slight declines. Signs point to likelihood of a reversal of the downward trend of the past several weeks.

Steel: Rate of operations has fallen off considerably. Current rate, now below 66%, is down about 10 points in a month, although still considerably above the rate of a year ago. Current export sales and encouraging prospects of steel buying by the automotive industry maintain feeling of optimism. Although rate may still decline steel circles are looking for a leveling out in the near future.

Automotive: February production ran above expectations, with month's output approximately 395,000-405,000 units. Total of 400,000 would be the highest for month since the record mark in 1929, 28% ahead of a year ago and off only 10% from January's record high of 449,314 units. More than likely March quarter will end with an advance of about 12% as contrasted with expected seasonal decline of about 4.5%.

Carloadings: Loadings have continued to decline for several weeks. For the week ending Feb. 24, decline brought loadings down to 595,032, which was 2.1% below preceding week, but 6.9% above corresponding week in 1939. However, loadings for week ended March 2 rose to about 640,000 cars, a contra-seasonal gain.

Retail Trade: Retail trade has been somewhat "spotty" because of slacken-

State of Chemical Trade

Current Statistics (February 29, 1940)—p. 54

ing in certain industries and because of weather conditions. Sales are still holding above last year by 3-9%. Retailers' orders are shaped closely to store turnover. Chain stores and mail order companies are reporting February results substantially above a year ago.

Wholesale Trade: Sales based on reports from 2,776 firms, representing all sections increased 10.3% in January over the same month a year ago.

Commodity Prices: Following the steady decline in January, Bureau of Labor Statistics index of wholesale commodity prices rose 0.4% in week ending Feb. 24. Higher prices for grains and foodstuffs largely accounted for increase which brought the all-commodity index to 78.6% of the 1926 average. Copper, lead, and zinc after considerable weakness registered gains in the last part of the month.

Electric Output: Production for week ended Feb. 24 amounted to 2,455,-285,000 kwh against 2,225,690,000 kwh in like 1939 period. This represented an increase of 10.3%. For the past two months increase has held a steady advantage of about 11.8% over like period of a year ago.

Textile: Federal Reserve Board reports cotton textile output continues at high rate. Output of woolens declined further from the peak levels of October and November. Output of silk goods continues in small volume. Index of textile production, as a whole, dropped to 114 from 123.

Outlook: Business and industrial activity continued to recede in February but towards the end of the period the declines were noticeably smaller and there are significant signs of a reversal of the downward trend. Most encouraging is the remarkably large volume of retail automotive sales. Current export sales and prospects are encouraging. Figures for January show an increase of 70% in total merchandise exports over same month last year. Despite speculation over possible early termination of the war, our own shipping regulations governing trade with belligerents, and the likelihood of still further stringent blockade action by England, there is still a feeling of optimism.

Normal seasonal rises in industrial activity are confidently looked for. March volume of business is expected to reach highest levels for first quarter. Inventories, in most cases are not excessive. With a resumption of business activity higher commodity prices are a distinct possibility.

MONTHLY STATISTICS (cont'd)

FERTILIZER: (Cont'd)	Jan. 1940	Jan. 1939	Dec. 1939	Dec. 1938	Nov. 1939	Nov. 1938
Superphosphate e (Nat. Fert. Association)						
Production, total	391,803	276,440	359,432	291,832	359,292	287,123
Shipments, total	213,248	186,881	220,404	163,992	166,230	133,803
Northern area	85,647	67,881	111,688	65,432	91,219	66,239
Southern area	127,601	118,799	108,716	98,560	75,011	67,564
Stocks, end of month, total	1,913,279	1,898,213	1,689,997	1,768,103	1,508,231	1,595,469
Tag Sales (short tons, Nat. Fert. Association)						
Total, 17 states	428,643	450,581	189,564	219,046	110,205	146,872
Total, 12 southern	380,009	438,805	187,942	217,180	108,139	146,145
Total, 5 midwest	48,634	12,476	1,622	1,866	2,066	727
Fertilizer employment *i*	102.8	102.9	102.2	92.3	91.2	88.0
Fertilizer payrolls *i*	82.3	75.2	82.2	70.3	76.0	65.4
Value imports, fert. and mat. *d*	......	$3,427	......	......	$2,159	$2,805
GENERAL:						
Acceptances outst'd'g *f*	$229	$255	$232	$269	$222	$273
Coal prod., anthracite, tons	5,631,000	4,952,000	3,862,000	4,533,006	3,946,000	3,803,000
Coal prod., bituminous, tons	46,155,000	37,750,000	37,283,000	36,541,000	42,835,000	35,925,000
Com. paper outst'd'g *f*	$219.4	$195.2	$209	$186	$214	$206
Failures, Dun & Bradstreet	1,237	1,567	882	875	886	984
Factory payrolls *i*	98.1	83.2	103.9	87.1	101.8	84.4
Factory employment *i*	101.6	89.3	104.0	94.0	103.8	93.3
Merchandise imports *d*	......	178,201	232,738	165,359	235,402,000	176,187,000
Merchandise exports *d*	358,000	210,000	357,450	266,358	292,734,000	252,381,000
GENERAL MANUFACTURING:						
Automotive production	432,101	342,168	452,142	388,346	351,785	372,413
Boot and shoe prod., pairs	33,743,678	33,561,000	28,411,553	29,987,849	31,872,015	30,053,832
Bldg. contracts, Dodge *j*	196,191	251,673	354,098	389,098	$299,847	$301,679
Newsprint prod., U. S. tons	84,126	77,264	77,836	75,855	78,886	75,855
Newsprint prod., Canada, tons.	251,032	208,382	240,656	209,753	288,726	245,226
Glass Containers, gross‡	4,263	3,589	4,046	3,516	4,300	3,709
Plate glass prod., sq. ft.	17,254,241	12,209,080	12,691,262	18,477,277	15,812,000	12,883,448
Window glass prod., boxes	1,413,432	943,184	1,188,940	1,003,150	1,142,570	882,595
Steel ingot prod., tons	5,017,000	3,174,000	5,164,420	3,130,746	5,462,616	3,558,363
% steel capacity	83.18	52.48	85.57	52.79	93.26	61.81
Pig iron prod., tons	3,600,020	2,175,423	3,768,336	2,210,728	3,720,436	2,269,983
U.S. cons'pt. crude rub., lg. tons	54,978	46,234	48,428	45,315	54,322	49,050
Tire shipments	4,276,512	4,057,370	4,740,112	4,170,808	4,244,000	4,442,296
Tire production	4,976,548	4,464,091	4,479,386	4,678,878	4,867,000	4,117,457
Tire inventories	9,388,742	8,932,245	8,688,215	8,497,932	9,244,000	7,924,114
Cotton consumpt., bales	730,143	598,132	652,695	565,307	718,721	596,416
Cotton spindles oper.	22,872,414	22,496,544	24,943,302	22,432,648	22,774,170	22,447,106
Silk deliveries, bales	29,506	40,816	21,128	35,204	32,241	41,599
Wool Consumption *z*	......	......	32.6	29	39.0	34.1
Rayon deliv., lbs.	31,900,000	27,100,000	32,000,000	26,200,000	32,900,000	21,700,000
Hosiery (all kinds) *t*	......	8,743,677	8,080,049	8,471,326	10,028,333	9,035,186
Rayon employment *i*	313.7	300.3	312.2	298.4	314.0	299.9
Rayon payrolls *i*	320.7	283.3	314.0	276.8	310.7	277.1
Soap employment *i*	83.4	79.1	84.9	78.9	87.5	79.2
Soap payrolls *i*	100.3	94.9	102.3	93.3	103.9	91.9
Paper and pulp employment *i*	114.3	105.5	115.6	106.3	115.3	105.9
Paper and pulp payrolls *i*	117.3	102.7	122.7	103.5	124.7	108.0
Leather employment	87.5	87.3	86.9	86.6	87.9	85.3
Leather payrolls *i*	86.3	85.8	86.5	85.1	87.2	82.3
Glass employment *i*	106.1	95.3	108.5	99.0	110.2	98.0
Glass payrolls *i*	114.4	96.6	118.3	104.3	120.6	103.5
Rubber prod. employment *i*	90.0	81.3	92.9	83.5	94.0	82.3
Rubber prod. payrolls *i*	94.1	82.2	99.1	86.8	100.0	83.0
Dyeing and fin. employment *i*	129.9	124.4	133.0	123.0	134.3	120.0
Dyeing and fin. payrolls *i*	109.6	106.2	116.4	106.5	115.0	101.6
MISCELLANEOUS:						
Oils & Fats Index ('26 = 100)	......	......	......	57.5	58.4	57.8
Gasoline prod., *p*	52,351	48,119	52,691	48,026	60,656	48,201
Cottonseed oil consumpt., bbls.	......	229,666	......	209,706	......	263,024
PAINT, VARNISH, LACQUER, FILLERS:						
Sales 680 establishments	$28,666,635	$25,166,042	$26,810,005	$21,281,326	$30,472,039	$26,253,314
Trade sales (580 establishments)	$13,549,867	$12,406,701	$12,687,134	$9,885,307	$14,980,510	$13,183,545
Industrial sales, total	$12,317,340	$10,269,334	$11,589,021	$9,293,043	$12,482,932	$10,638,281
Paint & Varnish, employ. *i*	123.5	116.5	124.4	117.1	125.4	117.1
Paint & Varnish, payrolls *i*	128.8	115.3	130.0	117.6	132.0	116.0

a Bureau of Mines; *b* Crude and refined plus motor benzol, Bureau of Mines; *c* Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; *d* 000 omitted, Bureau of Foreign & Domestic Commerce; *e* Expressed in equivalent tons of 16% A.P.A.; *f* 000,000 omitted at end of month; *i* U. S. Dept. of Labor, 3 year average, 1923-25 = 100, adjusted to 1937 census totals; *j* 000 omitted, 37 states; *p* Thousands of barrels, 42 gallons each; *q* 680 establishments, Bureau of the Census; *r* Classified sales, 580 establishments, Bureau of the Census; *s* 53 manufacturers, Bureau of the Census; *t* 384 identical manufacturers, Bureau of the Census, quantity expressed in dozen pairs; *v* In thousands of bbls., Bureau of the Census; ** Indices, Survey of Current Business, U. S. Dept. of Commerce; *z* Units are millions of lbs.; ‡ 000 omitted.

Chemical Finances

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Victor Chemical Earnings

Report of Victor Chemical Works and subsidiaries for year ended December 31, 1939, shows net profit of $1,104,404 after depreciation, interest, foreign exchange adjustment, minority interest, federal in come taxes, etc., equal to $1.59 a share (par $5) on 696,000 shares of capital stock.

This compares with net profit of $730,-092 or $1.05 a share in 1938.

Consolidated income account for year 1939, follows: Net sales $8,393,581; costs, expenses, etc. $6,581,562; depreciation and obsolescence $465,919; profit from operations $1,346,100; other income $54,652; total income $1,400,752; interest $22,528; foreign exchange adjustment $2,801; federal income taxes $246,593; minority interest $24,426; net profit $1,104,404; dividends $974,400; surplus $130,004.

Merck's Net $1,856,830

Report of Merck & Co., Inc., and subsidiaries (manufacturing chemists) for year ended December 31, 1939, shows net profit of $1,856,830 after depreciation, federal and Canadian income taxes, contingency reserve, etc., equal after dividend requirements on 6% cumulative preferred stock, to $5.26 a share (par $1) on 300,000 shares of common stock.

Earnings Statements Summarized

Company:	Annual dividends	Net income 1940	Net income 1939	Common share earnings 1940	Common share earnings 1939	Surplus after dividends 1940	Surplus after dividends 1939
Abbott Laboratories:							
Year, Dec. 31	y$2.05	$2,048,094	$1,648,326	$2.61	$2.43	......	......
Air Reduction Co., Inc.:							
Eleven months, Nov. 30	y 1.50	4,609,855	....	1.80	...	......	......
Atlantic Rayon Corp.:							
Year, Dec. 31	y .10	131,600	†72,029	.56	...	......	......
Bell Telephone Co. of Pennsylvania:							
Year, Dec. 31	8.00	10,426,010	10,050,890	8.29	7.95	......	......
Bristol-Myers Co.:							
Dec. 31 quarter	2.40	435,925	413,325	.64	.61	......	......
n Year, Dec. 31	2.40	2,379,785	2,217,810	3.49	3.25	......	......
Celanese Corp. of Amer.:							
Year, Dec. 31	z 1.00	6,216,781	2,479,748	3.53	.26	......	......
Celluloid Corp.:							
Year, Dec. 31	f ...	202,826	†194,131	s1.45	...	......	......
Colgate-Palmolive-Peet Co.:							
n Year, Dec. 31	y 1.00	6,632,655	4,921,921	2.74	1.77	$3,411,366	$2,987,762
Compressed Industrial Gases, Inc.:							
Year, Dec. 31	.....	322,870	33,907	1.23	.12	......	......
Goodyear Tire & Rubber Co. of Canada, Ltd.:							
Year, Dec. 31	y 5.00	1,652,502	2,228,879	5.25	7.49	......	......
Industrial Rayon Corp.:							
Year, Dec. 31	y .75	1,348,924	184,410	1.77	.24	779,430	......
International Vitamin Corp.:							
Dec. 31 quarter	.30	49,588	19,298	.24	.09	......	......
Six months, Dec. 31 ...	.30	85,107	67,906	.42	.33	......	......
Monsanto Chemical Co.:							
n Year, Dec. 31	y 3.00	x5,546,416	x3,290,519	4.01	2.35	......	......
National Oil Products Co.:							
Year, Dec. 31	k 1.85	700,401	401,871	h3.89	j2.28	......	......
Owens-Illinois Glass Co.:							
Year, Dec. 31	y 2.00	8,434,915	5,383,805	3.17	2.02	3,112,507	1,391,999
St. Joseph Lead Co.:							
Year, Dec. 31	y 2.00	5,292,907	1,331,256	2.70	.68	1,381,547	d624,424
United Carbon Co.:							
Year, Dec. 31	y 3.00	1,518,266	1,505,874	3.81	3.78	324,611	212,748
United Chemicals, Inc.:							
Year, Dec. 31	f ...	221,768	42,290	...	...	......	......
U. S. Gypsum:							
Year, Dec. 31	k 4.00	7,365,847	4,725,497	5.71	3.50	......	......
U. S. Rubber Co.:							
Year, Dec. 31	f ...	10,218,849	5,885,887	j3.18	.43	......	......
Westvaco Chlorine Products Corp.:							
n Year, Dec. 31	y 1.95	1,275,078	803,675	2.91	1.52	......	......
Zonite Products Corp.:							
Year, Dec. 31	f ...	†26,903	49,916	...	.06	......	......

a On first preferred stock; *b* On second preferred stock; *d* Deficit; *f* No common dividend; *k* For the year 1939; *p* On preferred stock; *y* Amount paid or payable in 12 months to and including the payable date of the most recent dividend announcement; ‡ Indicated quarterly earnings as shown by comparison of company's reports for the 6 and 9 months periods; § plus extras; n Preliminary statement; *h* on shares outstanding at close of respective periods; ** Indicated quarterly earnings as shown by comparison of company's reports for 1st quarter of fiscal year and the six months period; ‡‡ Indicated earnings as compiled from quarterly reports. † Net loss.

Price Trend of Representative Chemical Company Stocks

	Feb. 3	Feb. 10	Feb. 17	Feb. 24	Mar. 1	Net gain or loss last mo.	Price on Mar. 4 1939	1940 High	1940 Low
Air Reduction Inc.	49⅞	51¾	51½	50	49	—⅞	57½	58⅛	48¼
Allied Chemical & Dye	172¼	179	177½	178½	174½	+¼	177	180	171
Amer. Agric. Chem.	20⅛	20½	20⅛	20⅛	19⅝	—⅜	25½	21	19⅝
Amer. Cyanamid "B"	34¼	34⅜	35¼	37	36½	+2¼	20½	37⅞	31¾
Columbian Carbon	87⅞	89¼	93	93	95	+7⅛	87½	95	87⅞
Commercial Solvents	14⅛	14⅜	14⅛	13⅞	13⅝	—½	13	15⅜	13⅛
Dow Chemical Co.	150¼	152⅛	154¼	152½	154⅜	+4⅛	119¾	156½	142
Du Pont	178⅞	184	185⅞	184	184⅜	+4½	150⅞	185⅞	175
Hercules Powder	88¾	90¼	89½	89¾	88	—¾	76¾	91	87½
Mathieson Alkali	29¼	30½	30¾	29¾	29¾	+½	28¾	31¾	28¼
Monsanto Chem. Co.	106⅝	110	110	109	107	+⅜	98¼	110¼	104
Standard Oil of N. J.	43½	44⅜	44¾	43⅛	44	+½	49½	46½	42¾
Texas Gulf Sulphur	34¼	35⅜	35	34⅞	34½	+¼	30¼	35½	32¾
Union Carbide & Carbon	79¼	83½	84⅝	84⅞	83¾	+4½	85	88⅜	78½
U. S. Industrial Alcohol	22	22	21¼	21½	21⅜	—⅝	22¼	26¼	21

Dividends and Dates

Name	*Div.*	*Stock Record*	*Payable*
Allegheny Ludlum Stl., pf., q.	$1.75	Feb. 15	Mar. 1
Am. Chicle Co., q.	$1.00	Mar. 1	Mar. 15
Atlas Pow. Co.	75c	Feb. 29	Mar. 11
Bristol-Myers Co., q.	60c	Feb. 15	Mar. 1
Celanese Corp. of Am.	50c	Mar. 14	Apr. 1
Stock Div. (1 sh. for each 40 held)		Mar. 15	May 1
7% 1st pf. ...	$3.50	June 14	June 30
7% 1st par. pf.	$2.72	Mar. 15	Apr. 1
7% pr. pf., q. ..	$1.75	Mar. 15	Apr. 1
7% pr. pf., q.	$1.75	June 14	July 1
Colgate-Palmolive-Peet pf., q.	$1.50	Mar. 5	Apr. 1
Comp. Indus. Gases	25c	Feb. 29	Mar. 15
Devoe & Raynolds Co., Inc., 2d pf., q.	$1.75	Mar. 20	Apr. 1
Du Pont (interim)	$1.75	Feb. 26	Mar. 14
$4.50 pf., q. ...	$1.12½	Apr. 10	Apr. 25
Durez Plastics & Chems., Inc., q.	50c	Feb. 16	Mar. 1
7% pf., q.	$1.75	Feb. 16	Mar. 1
6% pf., q.	37½c	Feb. 16	Mar. 1
Eastman Kodak Co., q.	$1.50	Mar. 5	Apr. 1
Pfd., q.	$1.50	Mar. 5	Apr. 1
Freeport Sulphur, q.	25c	Feb. 16	Mar. 1
Heyden Chem. Corp., q.	50c	Feb. 19	Mar. 1
Hooker Electro-chemical	$1.25	Feb. 15	Feb. 29
Humble Oil Ref. Co.	37½c	Mar. 2	Apr. 1
Special	25c	Feb. 19	Mar. 1
Merck & Co.	25c	Mar. 20	Apr. 1
6% pf., q.	$1.50	Mar. 20	Apr. 1
Monsanto Chem. Co. q.	50c	Mar. 1	Mar. 15
Monroe Chem. Co., pf., q.	87½c	Mar. 11	Apr. 1
National Gypsum Co., pf., q.	$1.12½	Feb. 17	Mar. 1
National Lead Co., pf. A, q.	$1.75	Mar. 1	Mar. 15
N. J. Zinc Co.	50c	Feb. 17	Mar. 9
Procter & Gamble 5% pf., q.	$1.25	Feb. 23	Mar. 15
St. Joseph Lead, q.	25c	Mar. 8	Mar. 20
Texas Corp, q.	50c	Mar. 1	Apr. 1
Texas Gulf Sulphur Co., q.	50c	Mar. 1	Mar. 15
United Chem., p., (div. due Sept. 1, 1937)	75c	Feb. 10	Mar. 1
Vick Chem. Co., q.	50c	Feb. 15	Mar. 1
Extra	10c	Feb. 15	Mar. 1
Westinghouse Elec. & Mfg. Co.	87½c	Feb. 13	Feb. 29
Participating pf..	87½c	Feb. 13	Feb. 29
Westvaco Chlorine Products	35c	Feb. 10	Mar. 1
West Virginia Pulp & Paper Co. ...	10c	Mar. 11	Apr. 1

This compares with $579,356 or $1 a common share in 1938.

Current assets as of December 31, 1939, totaled $8,202,271 and current liabilities were $2,038,258 compared with $6,005,810 and $940,099 respectively at end of preceding year.

Commercial Solvents

Consolidated net earnings of Commercial Solvents Corporation and subsidiaries for the year ended December 31, 1939, amounted to $1,600,389, as against a consolidated net loss of $294,358 for the year, 1938, President Theodore P. Walker reports to stockholders. The 1939 earnings are equivalent to 60.7c per share after provision for taxes and depreciation.

No dividend action was taken during 1939, Mr. Walker explained, because the directors felt it was "wise to conserve funds for present and future expansion of the corporation's activities and further reduction of bank indebtedness."

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Chemical Stocks and Bonds

Feb. 1940 Last	Feb. 1940 High	Feb. 1940 Low	1939 High	1939 Low	1938 High	1938 Low	Sales: Number of shares February 1940	Sales: 1940	Stocks	Par $	Shares Listed	Dividends*	Earnings** $-per-share-$ 1939	1938	1937
NEW YORK STOCK EXCHANGE															
68¾	70¼	68	71½	53	61	46¼	3,200	7,500	Abbott Labs.	No	752,468	$2.05	2.61	2.43	2.51
48¾	58⅛	48¼	68	45¼	67⅞	40	24,200	41,300	Air Reduction	No	2,563,992	1.50	....	1.47	2.86
175½	180	171	200½	151½	197	124	9,300	18,200	Allied Chem & Dye	No	2,214,099	9.00	....	5.92	11.19
20	21	19¾	24½	16	28½	22	1,900	5,900	Amer. Agric. Chem	No	627,987	1.30	....	2.23	2.95
6¾	8¼	6⅝	11⅞	5½	15	9	1,600	5,600	Amer. Com. Alcohol	No	260,930	....	....	—2.05	3.23
35	35½	31½	37	21	31½	20	1,200	2,600	Archer-Dan.-Midland	No	545,416	1.10	....	.43	5.03
70⅛	73	63	71	50	68	36	3,100	4,600	Atlas Powder Co.	No	250,288	3.00	3.82	2.69	4.40
120	124¾	120	127	116	126¼	105	270	460	5% conv. cum. pfd.	100	68,597	5.00	....	14.77	20.90
28½	30⅜	26⅝	30¼	13⅝	26⅝	9	63,400	100,300	Celanese Corp. Amer.	No	1,000,000	.50	....	.28	2.04
113½	114¾	107½	109⅞	84	96	82	2,280	5,590	prior pfd	100	164,818	7.00	....	15.05	27.07
19⅛	20	16⅝	18	11½	17	7⅛	64,900	120,100	Colgate-Palm.-Peet	No	1,962,087	1.00	2.74	1.77	—.35
105⅛	106½	103⅞	107	101⅞	104¼	78	5,700	7,500	6% pfd.	100	125,000	6.00	....	21.12	3.21
93	93¼	87⅞	96	73	98½	53¾	2,900	4,300	Columbian Carbon	No	537,406	4.50	....	5.13	8.31
13½	15⅝	13½	16	8⅝	12¼	5⅞	61,900	161,400	Commercial Solvents	No	2,636,878	....	.61	—.11	.60
63	65⅛	62	67½	54⅞	70¾	53	11,500	22,800	Corn Products	25	2,530,000	3.00	....	3.18	2.52
172	177	172	177	150	177	162	500	1,000	7% cum. pfd.	100	245,738	7.00	....	39.69	32.96
20⅝	23¼	20	32⅜	18	40⅞	25	1,920	3,620	Devoe & Rayn. A.	No	95,000	....	2.05	—1.72	4.05
152½	156½	142	144⅝	101½	141	87⅞	6,000	13,700	Dow Chemical	No	945,000	3.00	....	3.91	4.15
184½	185⅞	175	188½	126¼	154¾	90½	25,000	50,100	DuPont de Nemours	20	11,065,762	7.00	7.70	3.74	7.37
125¼	125¼	122	124⅛	112	120½	109½	6,750	16,750	4½% pfd.	No	500,000	4.50	....	87.27	165.48
151¼	166¾	145⅞	186⅛	138⅛	187	121½	14,600	22,400	Eastman Kodak	No	2,250,921	6.00	....	7.54	9.76
177	178	173	183½	155½	173	157	200	320	6% cum.	100	61,657	6.00	....	281.22	362.45
34⅛	35	31⅞	36	18¼	32	19⅞	12,000	23,500	Freeport Texas	10	796,380	1.50	....	1.87	3.30
9	10	9	10⅞	7	12⅛	6¾	4,300	8,200	Gen. Printing Ink	1	735,960	.80	.94	.62	1.32
17¼	19¾	17	24½	14	28½	13	5,500	22,400	Glidden Co.	No	829,989	.50	....	—.20	2.62
43	43	38½	47	34	51½	37	700	2,500	4½% cum. pfd.	50	199,940	2.25	....	1.08	12.72
109	113¼	107	112¼	93	111	76¾	1,400	3,000	Hazel Atlas	25	434,409	5.00	6.64	4.97	6.67
88	91	87½	101½	63	87	42¾	4,300	13,100	Hercules Powder	No	1,316,710	2.85	3.65	1.95	2.97
132	133½	131	135½	128½	135¼	126¾	730	1,210	6% cum. pfd.	100	96,194	6.00	....	35.31	50.75
26½	29	25⅞	29½	16¾	30⅜	14⅜	6,300	12,000	Industrial Rayon	No	759,325	.75	1.77	.24	.34
42⅛	44⅛	40	46¼	17½	34½	15	4,600	10,200	Interchem.	No	289,618	.40	....	.32	1.44
110	110½	108	109½	90	98	80	630	1,360	6% pfd.	100	65,661	6.00	....	7.39	12.26
2	2⅛	1⅝	3⅝	1½	3⅞	2	7,000	17,600	Intern. Agricul.	No	436,048	....	....	....	.16
33½	38	32⅛	41	16	29	15	1,500	3,100	7% cum. pfd.	100	100,000	....	....	7.01	7.70
36¾	38⅞	35⅝	55¾	35	57⅝	36⅞	60,500	135,500	Intern. Nickel	No	14,584,025	2.00	....	2.09	3.31
36	36	34¾	38	29	30¼	19½	900	1,400	Intern. Salt	No	240,000	1.75	1.92	2.29	2.11
23⅛	23¼	21	22½	14½	24	19⅛	1,300	2,800	Kellogg (Spencer)	No	509,213	1.10	....	.71	2.81
49½	53⅜	48¼	56¾	36½	58⅜	23¼	14,400	30,100	Libbey Owens Ford	No	2,513,258	2.75	3.21	1.57	4.19
17¼	18⅛	15½	19	13½	21½	12⅛	12,800	27,800	Liquid Carbonic	No	700,000	1.00	....	1.81	2.37
30	31¾	28¼	37⅜	20¾	36⅞	19¾	7,100	14,000	Mathieson Alkali	No	828,171	1.50	1.12	1.01	1.81
107¼	110¼	104	114¾	85¾	110	67	24,800	33,200	Monsanto Chem.	No	1,241,816	3.00	4.01	2.35	4.40
117¾	118	117	121	110	117½	111	110	390	4½% pfd. A.	No	50,000	4.50	....	31.51	49.99
121½	121½	120	122½	112	...	...	80	380	4½% pfd. B.	No	50,000	4.50	....	31.51	49.99
21¾	21¾	19⅛	27½	17⅞	31	17⅛	23,300	46,900	National Lead	10	3,095,100	.87	....	.75	.95
171	173⅜	170	173⅛	152	178½	154	500	900	7% cum. "A" pfd.	100	213,793	7.00	....	26.03	22.86
146¾	148½	144	145	132	145½	127	230	860	6% cum. "B" pfd.	100	103,277	6.00	....	35.97	43.77
12⅞	14¼	11¼	17¾	8½	19½	9⅞	24,300	36,900	Newport Industries	1	621,359	....	....	—.08	2.22
60½	64⅝	59½	70	50	76¼	40	10,500	28,500	Owens-Illinois Glass	12.50	2,661,204	2.00	....	2.02	3.51
68¾	69⅛	65¾	66	50⅝	59	39½	18,500	36,300	Procter & Gamble	No	6,325,087	2.25	....	2.50	4.08
113¾	118½	112⅝	119¾	112	122¼	114	1,040	1,770	5% pfd.	100	169,517	5.00	....	101.81	157.05
11	13⅛	10⅞	17¼	9⅞	18⅜	10	12,600	22,300	Shell Union Oil	No	13,070,625	.50	.77	.70	1.44
106	108¼	105	107⅞	98½	106½	93	1,700	3,000	5½ cum. pfd.	100	341,000	5.50	....	33.18	60.59
20	22¼	19½	29½	15½	34¾	18½	2,000	5,600	Skelly Oil	No	995,349	.75	....	2.27	6.07
103 13/32	103 13/32	94¼	98¼	92	98	84	5,700	7,000	6% cum. pfd.	100	64,500	6.00	....	41.09	97.86
25⅞	27¾	25½	30	22¾	35½	24¾	25,800	70,400	S. O. Indiana	25	15,272,020	1.25	....	1.82	3.16
43¾	46½	42¾	53½	38	58⅜	39¾	64,200	141,300	S. O. New Jersey	25	26,618,065	1.25	....	2.86	5.64
6⅛	6⅞	5⅝	9⅛	4	8	3⅞	3,000	6,600	Tenn. Corp.	5	853,696	....	....	.46	1.09
44⅜	46⅞	42⅜	50¾	32½	49⅝	37⅝	49,800	97,500	Texas Corp.	25	10,876,882	2.00	....	2.13	5.02
34½	35½	32¾	38½	26	38	26	13,000	25,900	Texas Gulf Sulphur	No	3,840,000	2.00	2.04	1.81	3.02
82⅜	88⅜	78½	94¼	65½	90⅞	57	29,700	66,300	Union Carbide & Carbon	No	9,073,288	1.90	....	2.77	4.81
57½	60¼	54⅝	69½	52	73½	39	1,800	5,800	United Carbon	No	397,885	3.00	3.81	3.78	5.91
21⅝	26¼	21	29⅜	13½	30¼	13½	4,300	15,900	U. S. Indus. Alcohol	No	391,238	....	....	—1.08	1.24
33¼	34¾	28⅜	40	16	28⅞	11½	15,500	35,000	Vanadium Corp. Amer.	No	377,140	1.00	3.25	.61	2.22
29¾	31	28¾	29¾	18¼	25¼	13½	2,100	5,900	Victor Chem.	5	696,000	1.40	....	1.05	1.01
3¼	4⅛	3¼	5¾	2½	5⅝	2¾	3,000	7,600	Virginia-Caro. Chem.	No	486,122	....	....	—1.80	—.05
28	31¾	27½	33¾	17	32⅛	15¾	2,600	7,300	6% cum. part. pfd.	100	213,052	....	....	1.90	5.88
37½	38½	33½	39¼	15¼	20⅛	10	5,800	12,500	Westvaco Chlorine	No	339,362	1.85	....	1.52	1.46
36¾	39¼	35⅝	39½	29	31½	20	2,500	5,500	cum. pfd.	30	192,000	1.50	....	4.19	4.09
NEW YORK STOCK EXCHANGE															
36⅞	37⅞	31¾	35¾	18⅜	30¼	15½	65,200	105,500	Amer. Cyanamid "B"	10	2,520,368	.60	....	.91	2.09
113	113½	105	112¾	76	92	50	2,575	4,375	Celanese, 7% cum. 1st pfd.	100	148,179	7.19	....	8.95	22.32
5⅛	5⅞	3½	6¾	3	6¾	3	1,800	5,300	Celluloid Corp.	15	194,952	....	....	—2.73	—.92
7	7¾	7	7⅞	4½	12	6½	100	700	Courtauld's Ltd.	£1	24,000,000	.13	....	.26%	8.64%
7¼	7⅝	6½	9¼	5	9⅞	6	800	4,000	Duval Texas Sulphur	No	500,000	....	....	.71	.43
78⅝	79½	67	68	30	41¼	27	2,150	5,000	Heyden Chem. Corp.	100	149,643	2.00	....	2.07	3.94
104	104	99	117	90	115½	55	3,700	10,200	Pittsburgh Plate Glass	25	2,142,443	4.00	....	3.00	8.53
91	96½	89	113½	81	117¾	66	4,050	8,200	Sherwin Williams	25	638,927	2.75	....	2.43	8.76
112¼	114¾	111	116	106½	114⅛	107	180	410	5% cum. pfd.	50	132,189	5.00	....	8.76	45.50
PHILADELPHIA STOCK EXCHANGE															
171½	175	166¼	179	135	167	121½	525	950	Pennsylvania Salt	50	150,000	6.00	10.52	6.90	11.79

Feb. 1940 Last	Feb. 1940 High	Feb. 1940 Low	1939 High	1939 Low	1938 High	1938 Low	Sales: February 1940	Sales: 1940	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
103⅞	104	102	103¾	98	105⅝	99⅛	195,000	365,000	Amer. I. G. Chem. Conv.	1949	5½	M-N	$22,400,000
35	40	34	41½	19	38	25⅛	36,000	211,000	Anglo Chilean Nitrate inc. deb.	1967	4½	J	10,400,000
105½	107¼	105½	108⅜	101¾	106⅛	102⅜	48,000	98,000	Dow Chemical	1951	3	J-D	5,000,000
104⅝	105	101	102½	90	94	93	204,000	315,000	Industrial Rayon	1948	4½	J-J	7,100,000
102½	103½	99⅞	103½	99⅞	102¾	100	3,000	4,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M-N	3,900,000
35½	39¾	34¼	37	21½	35⅝	24¾	116,000	360,000	Lautaro Nitrate inc. deb.	1975	4	J-D	27,200,000
16½	....	....	30	16	35⅝	24¾	......	......	Ruhr Chem.	1948	6	A-O	1,500,000
95½	96½	95	95¾	88¾	...	...	437,000	958,000	Shell Union Oil	1954	2½	J-J	85,000,000
102¾	105	102 11/32	105¾	98	104⅜	90¼	17,000	53,000	Skelly Oil	1951	4	J-J	9,000,000
105⅛	106¼	104⅝	106¼	97⅜	105⅜	100	132,000	426,000	Standard Oil Co. (New Jersey) deb.	1961	3	J-D	85,000,000
105	105⅝	104¾	106½	94¼	103	98	185,000	329,000	Standard Oil Co. (New Jersey) deb.	1953	2¾	J-J	50,000,000
106⅛	107⅜	105⅛	108⅝	102	103	95	224,000	377,000	Texas Corp.	1951	3½	J-J	60,000,000
105	106½	104⅝	105⅞	95¼	...	...	239,000	568,000	Texas Corp.	1961	3	J-4	40,000,000
101½	105	101⅛	118½	96	101	77	91,000	181,000	Vanadium Corp. conv.	1953	5	J-J	2,700,000

* Paid in 1939, including extras but excluding dividends paid in stock. ** For either fiscal or calendar year.

Exports

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EXPORTS*

	Twelve Months Ending Dec. 1939 Quantity	Twelve Months Ending Dec. 1939 Dollars	Twelve Months Ending Dec. 1938 Quantity	Twelve Months Ending Dec. 1938 Dollars
GROUP 8.				
COAL-TAR PRODUCTS	....	14,612,465	....	9,890,448
Crude and refined coal tar gal.	7,620,209	343,600	7,128,169	403,433
Benzol .... gal.	12,990,391	1,915,033	10,613,464	1,801,727
Coal-tar pitch .... tons	10,444	173,544	28,797	221,769
Creosote or dead oil ..... gal.	2,397,796	337,252	532,545	90,819
Other crude coal-tar products, n.e.s. .... lb.	40,340,143	1,698,487	23,308,132	1,111,429
Phenol (carbolic acid) ..... lb.	2,058,398	281,299	....	....
Other coal-tar acids .... lb.	1,803,438	236,064	....	....
Other coal-tar intermediates, lb.	5,585,465	1,247,846	5,928,294	1,097,217
Rubber compounding agents of coal-tar products .... lb.	2,761,138	1,190,574	1,751,581	734,991
Colors, dyes, stains, and color lakes .... lb.	13,715,680	6,432,358	8,575,600	3,825,050
Other finished coal-tar products, ... lb.	3,345,998	756,408	2,733,511	604,013
MEDICINAL AND PHARMACEUTICAL PREPARATIONS	....	22,317,465	....	17,079,099
Castor oil .... gal.	168,464	158,626	74,697	76,774
White mineral oil .... gal.	1,665,945	708,697	1,249,108	535,539
CHEMICAL SPECIALTIES ..	....	36,040,819	....	28,952,884
Nicotine sulfate (40% basis) lb.	501,314	303,259	501,016	303,518
Copper sulfate (blue vitriol) lb.	29,239,575	1,157,498	31,249,735	1,229,317
Lead arsenate .... lb.	1,712,583	159,797	1,021,345	95,196
Calcium arsenate .... lb.	6,731,103	300,512	5,242,882	215,964
Petroleum oil sprays ...... gal.	249,466	83,010	261,736	70,954
Other agricultural insecticides, fungicides, and similar preparations and materials .... lb.	11,423,185	1,096,101	9,402,302	954,814
Household and industrial insecticides and exterminators:				
Liquid .... lb.	5,347,023	1,471,846	5,068,856	1,338,560
Paste, powder, or solid form, ... lb.	411,710	110,733	482,000	121,810
Household and industrial disinfectants, deodorants, germicides, repellants, and similar preparations .... lb.	3,153,337	290,880	2,239,036	248,228
Baking powder .... lb.	3,271,436	545,770	2,731,162	447,473
Petroleum jelly .... lb.	45,016,868	1,947,330	37,564,973	1,605,983
Tobacco extracts .... lb.	396,207	70,432	849,383	140,636
Dextrine or British gum ...lb.	8,616,761	381,327	6,681,277	274,128
Textile specialty compounds, lb.	10,426,080	792,146	5,319,600	454,139
Tanning specialty compounds, lb.	4,295,772	341,533	3,223,646	239,846
Water softeners, purifiers, boiler and feed-water compounds .... lb.	3,161,923	373,363	2,710,859	325,373
Metal-working compounds.. lb.	3,111,167	368,276	1,839,191	220,929
Synthetic gums and resins (powder, flake or liquid) ..... lb.	11,897,220	2,378,219	6,919,627	1,328,171
Pyroxylin products:				
Pyroxylin scrap and film scrap .... lb.	1,446,967	142,695	1,037,666	119,094
Pyroxylin plastic film support (film base) .... lb.	3,602,430	3,274,928	3,417,709	2,855,087
Pyroxylin sheets, rods, or tubes .... lb.	259,251	218,246	341,826	276,595
Cellulose acetate sheets, rods or tubes .... lb.	1,167,510	585,065	316,524	200,891
Cellulose acetate plastic film support .... lb.	1,045,613	1,548,023	375,619	473,426
Nitro and aceto cellulose:				
Solutions, collodion, etc. ..lb.	839,762	223,777	902,865	223,030
Not in solution .... lb.	4,333,325	851,361	3,255,305	565,554
Can cements .... lb.	673,576	160,004	440,495	98,587
Other cementing preparations for repairing, sealing, and adhesive use .... lb.	3,995,470	447,268	3,596,842	421,575
Specialty cleaning and washing compounds .... lb.	4,480,413	432,706	3,561,670	406,029
Polishes:				
Metal and stove polishes. lb.	678,776	106,746	712,677	105,058
Shoe polishes and shoe cleaners .... lb.	2,057,423	445,688	1,819,456	392,012
Leather dressings and stains, ... lb.	2,054,330	371,882	1,712,827	295,933
Floor wax, wood and furniture polishes .... lb.	1,258,745	206,783	1,069,945	198,297
Automobile polishes ...... lb.	1,374,312	261,110	1,477,076	294,098
Flavoring extracts .... gal.	90,853	657,156	91,906	511,230
Pectin .... lb.	481,953	297,195	311,198	205,285
Animal charcoal or bone char, deodorizing, decolorizing, and gas-absorbing carbons... lb.	3,072,616	178,199	3,486,681	137,510
Rubber compounding agents, n.e.s. .... lb.	1,151,736	324,417	506,466	151,472
Other chemical specialty compounds, n.e.s.	....	13,135,538	....	11,407,082
INDUSTRIAL CHEMICALS..	....	36,514,456	....	25,172,951
Acids and anhydrides:				
Acetic acid (100%) .... lb.	1,794,089	140,977	161,312	17,754
Acetic anhydride .... lb.	540,237	53,790	322,371	32,004
Other organic acids and anhydrides .... lb.	3,196,667	565,067	1,236,396	211,453
Inorganic:				
Hydrochloric (muriatic), lb.	7,374,937	129,999	6,296,717	123,864
Boric (boracic) .... lb.	18,572,635	866,589	11,191,341	514,442
Other inorganic acids and anhydrides .... lb.	18,463,713	676,055	11,514,739	504,221

* For comparable figures for 1937, 1936, see Statistical & Technical Data Section, May, 1938, p. 605.

EXPORTS

	Twelve Months Ending Dec. 1939 Quantity	Twelve Months Ending Dec. 1939 Dollars	Twelve Months Ending Dec. 1938 Quantity	Twelve Months Ending Dec. 1938 Dollars
Industrial Chemicals—Cont'd				
Alcohols:				
Methanol .... gal.	1,219,813	472,686	196,269	80,100
Butanol (butyl alcohol) ...lb.	7,618,568	592,667	4,286,386	360,071
Glycerin .... lb.	7,398,681	958,839	3,746,217	427,288
Other alcohols .... lb.	21,294,960	2,067,978	16,517,941	1,537,082
Acetone .... lb.	23,115,332	1,561,853	11,212,013	634,926
Butyl acetate .... lb.	6,828,283	561,529	4,143,737	402,654
Carbon bisulfide .... lb.	5,503,066	260,918	3,936,206	183,890
Formaldehyde (formalin) ... lb.	3,925,762	177,194	1,764,577	77,064
Amyl acetate .... lb.	461,481	59,693	255,069	31,441
Synthetic collecting reagents for concentration of ores, metals, or minerals .... lb.	11,583,482	1,905,173	8,488,530	1,430,965
Other organic chemicals ..... lb.	22,663,130	3,071,618	16,922,497	2,415,179
Aluminum sulfate .... lb.	69,467,086	744,755	55,430,233	578,330
Other aluminum compounds lb.	3,583,597	208,455	3,540,829	257,545
Calcium carbide .... lb.	8,328,059	260,001	3,982,012	123,774
Calcium chloride .... lb.	38,764,541	318,199	48,236,329	396,881
Potassium compounds (not fertilizers) .... lb.	7,157,890	807,987	5,232,596	485,672
Sodium compounds .... lb.	705,563,165	14,777,815	519,986,025	10,416,877
Bichromate and chromate, lb.	10,855,420	761,296	4,838,972	311,792
Cyanide .... lb.	2,338,620	294,732	1,136,161	149,324
Borate (borax) .... lb.	182,277,845	3,230,304	155,037,564	2,642,446
Silicate (water glass) .... lb.	16,038,869	252,618	12,098,638	203,664
Soda ash .... lb.	160,113,479	2,079,997	102,032,550	1,326,539
Bicarbonate (acid or baking soda) .... lb.	31,113,315	504,976	20,963,101	331,823
Hydroxide (caustic soda), dry weight .... lb.	260,999,692	5,535,060	200,047,429	4,095,159
Sodium phosphate (mono-, di-, tri-, meta-, or pyro-).. lb.	8,905,718	385,111	7,635,094	315,247
Other sodium compounds lb.	32,920,207	1,733,721	16,196,516	1,040,883
Tin compounds .... lb.	204,362	56,050	172,467	46,321
Gases, compressed, liquefied, and solidified:				
Ammonia, anhydrous ..... lb.	4,836,040	597,060	2,709,815	293,788
Other gaseous refrigerants, lb.	3,024,882	674,971	1,888,851	446,568
Chlorine .... lb.	12,000,749	256,557	9,486,384	255,697
Helium gas .... cu. ft.	235,738	22,458	3,515	1,126
Other gases, n.e.s. .... lb.	1,649,743	307,699	1,773,694	285,490
Other industrial chemicals	....	3,359,824	....	2,600,402
PIGMENTS, PAINTS, AND VARNISHES	....	22,761,324	....	18,654,592
Mineral-earth pigments (dry):				
Ocher, umber, sienna, and other forms of iron oxide for paints .... lb.	10,910,436	299,289	11,395,849	302,729
Other mineral-earth pigments (whiting, barytes, etc.) ..lb.	41,048,145	516,337	31,776,057	286,960
Chemical pigments (dry):				
Zinc oxide .... lb.	6,970,249	532,670	2,325,205	185,848
Lithopone .... lb.	9,690,621	392,798	3,467,620	153,567
Lampblack .... lb.	957,587	81,956	1,134,240	83,177
Carbon black or gas black, lb.	203,827,817	8,888,480	167,968,316	7,579,883
Red Lead .... lb.	2,647,536	186,396	1,613,052	115,348
Litharge .... lb.	4,155,287	253,731	3,387,683	203,610
White lead:				
Dry .... lb.	2,933,057	180,479	1,723,186	100,254
In oil .... lb.	1,114,431	94,832	1,098,919	90,541
Titanium dioxide and titanium pigments .... lb.	8,638,565	698,063	4,100,090	324,204
Other chemical pigments, lb.	9,947,242	1,493,424	5,415,953	1,016,153
Bituminous paints, liquid and plastic	....	384,157	....	263,566
Paste and semipaste paint colors in oil, putty, and paste wood filler .... lb.	3,267,880	523,473	2,509,043	382,739
Kalsomine or cold-water paints, dry .... lb.	9,225,205	491,135	7,584,198	412,334
Nitrocellulose (pyroxylin) lacquers:				
Pigmented .... gal.	601,111	1,364,600	600,033	1,417,270
Clear .... gal.	246,865	480,725	204,787	420,709
Thinners for nitrocellulose lacquers .... gal.	796,173	554,370	698,458	521,950
Ready-mixed paints, stains, and enamels .... gal.	2,607,352	4,707,295	2,366,457	4,239,695
Varnishes (oil or spirit, and liquid dryers) .... gal.	447,207	637,114	386,139	554,055
FERTILIZER AND FERTILIZER MATERIALS ..tons	1,395,066	17,140,905	1,568,577	16,531,184
Nitrogenous fertilizer materials:				
Ammonium sulfate ...... tons	46,664	1,466,077	30,716	762,543
Other nitrogenous chemical materials .... tons	111,575	3,161,383	158,621	3,972,532
Nitrogenous organic waste materials .... tons	12,542	269,536	19,153	429,132
Phosphatic fertilizer materials:				
Phosphate rock:				
High-grade hard rock.. tons	132,983	840,725	181,920	1,160,018
Land pebble .... tons	816,023	4,392,379	958,921	5,477,620
Superphosphate .... tons	95,224	1,010,336	90,237	945,351
Other phosphate materials, tons	29,080	192,306	33,074	283,668
Potassic fertilizer materials, tons	122,098	4,446,853	75,122	2,599,772
Nitrogenous phosphatic types .... tons	22,676	1,123,615	16,025	746,425
Prepared fertilizer mixtures, tons	6,201	237,695	4,788	154,123

Imports

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IMPORTS

	Twelve Months Ending Dec. 1939 Quantity	Dollars	Twelve Months Ending Dec. 1938 Quantity	Dollars
GROUP 8. COAL-TAR PRODUCTS	....	18,941,614	....	15,970,206
Dead or creosote oil, free, gal.	51,876,602	5,769,324	55,391,590	6,316,029
All other crudes, free	....	1,442,382	....	1,754,208
Acids, dut lb.	512,364	560,095	1,001,000	364,856
Other intermediates, dut lb.	2,154,817	2,506,729	1,754,933	1,905,468
Colors, dyes, stains, color acids, and color bases, n.e.s., dut lb.	5,137,909	8,057,667	3,317,058	5,061,700
Coal-tar medicinals, dut lb.	27,499	162,741	41,291	176,397
Other finished products, dut, lb.	315,693	442,676	115,5 3	391,548
MEDICINAL AND PHARMACEUTICAL PREPARATIONS	....	5,505,870	....	4,328,207
Quinine sulfate, free oz.	1,386,016	739,866	977,278	514,928
Other quinine and alkaloids and salts from cinchona bark, free oz.	2,318,712	651,677	1,609,430	370,258
Other alkaloids, salts and derivatives, dut	....	109,915	....	77,768
Antitoxins, serums, vaccines, etc., free oz.	1,869	1,757	747	1,352
Menthol, dut lb.	406,581	884,238	406,135	957,906
Santonin and salts, free lb.	3,048	59,737	771	14,829
Other medicinals, dut	....	1,497,837	....	1,162,416
Preparations in capsules, pills, tablets, etc., dut	....	472,355	....	492,866
Other preparations, n.e.s., dut	....	1,088,488	....	735,884
INDUSTRIAL CHEMICALS	....	17,632,348	....	16,794,391
Acetylene, butylene, ethylene, and propylene derivatives, dut lb.	1,626,653	342,067	1,201,728	231,511
Acids and anhydrides:				
Acetic or pyroligneous, dut, lb.	1,438,956	60,023	6,355,503	338,304
Arsenious (white arsenic), free lb.	29,347,810	562,037	28,475,783	608,029
Formic, dut lb.	522,481	27,513	587,947	41,213
Oxalic, dut lb.	183,223	9,091	569,552	28,387
Sulfuric (oil of vitriol), free lb.	4,205,730	27,402	2,779,672	19,025
Tartaric, dut lb.	115,858	24,552	....	....
All other, free lb.	1,234,584	34,489	581,210	16,448
dut lb.	3,280,624	117,505	505,586	115,217
Alcohols, including fusel oil dut	....	852	....	460
Ammonium compounds, n.e.s.:				
Chloride (muriate), dut lb.	8,487,112	191,136	6,583,230	160,40[illegible]
Nitrate, dut lb.	2,125,403	31,377	3,330,009	45,729
All other, dut lb.	1,161,026	108,707	633,467	66,369
Barium compounds, dut lb.	1,052,997	39,706	961,633	42,651
Calcium compounds, dut lb.	2,631,350	73,567	755,339	21,912
Cellulose products, n.e.s.:				
Acetate, dut lb.	6,975	6,961	4,410	5,184
All other:				
Sheets more than 3/1000 inch thick and other forms, dut lb.	82,011	45,549	59,120	50,953
Sheets, bands and strips more than 1 inch wide, not over 3/1000 inch thick, dut lb.	71,451	16,306	36,099	8,978
Camphor:				
Natural, crude, dut lb.	1,156,882	323,213	784,132	236,736
Natural, refined, dut lb.	818,055	329,206	718,668	329,013
Synthetic, dut lb.	528,030	212,963	563,773	207,102
Cobalt oxide, dut lb.	680,644	944,836	373,215	519,201
Copper sulfate lb.	....	....	160,000	....
(blue vitriol), dut [copper content] lb.	....	....	41,300	6,933
Glycerin, crude, dut lb.	10,987,731	729,264	13,097,525	1,028,192
Glycerin, refined, dut lb.	330,078	29,215	2,567,411	218,560
Iodine, crude, free lb.	200,000	168,238	570,532	464,303
Lime chlorinated or bleaching powder, dut lb.	1,323,103	47,014	1,859,967	47,964
Magnesium compounds, dut, lb.	7,143,920	158,513	9,199,188	166,823
Potassium compounds, n.e.s.:				
Carbonate, dut lb.	433,942	24,106	583,120	30,981
Chlorate and perchlorate, dut lb.	11,955,567	662,618	13,696,491	808,151
Cream of tartar, dut lb.	5,877	828	36,108	5,226
Cyanide, free lb.	101,520	35,886	83,664	29,751
Hydroxide (caustic), dut lb.	663,135	61,930	972,669	79,128
Argols, tartar, and wine lees, free lb.	17,370,292	1,216,940	317,745,083	2,471,892
All other, dut lb.	6,618,653	403,801	3,130,237	230,750
Sodium compounds, n.e.s.:				
Sulfate (salt cake), free, tons	132,868	1,394,568	127,169	1,331,966
Sulfate anhydrous and crystallized, dut tons	5,321	100,140	5,788	116,514
Chlorate, dut lb.	3,759,190	136,433	5,156,164	220,015
Cyanide, free lb.	42,685,775	3,123,063	26,387,452	2,403,823
Ferrocyanide (yellow prussiate), dut lb.	1,411,683	82,753	1,343,511	78,720
Nitrite, dut lb.	49,595	1,266	59,918	2,955
Phosphates (except pyrophosphate), dut lb.	11,688	1,138	1,928	151
All other, free lb.	34,791	535	90,111	2,133
dut lb.	12,166,018	418,176	....	429,224
Radium salts, free... milligrams	78,631	1,953,820	598	787,025
Other industrial chemicals, free	....	1,688,331	....	931,239
dut	....	1,664,714	....	1,809,150
PIGMENTS, PAINTS, AND VARNISHES	....	1,518,872	....	1,368,290

IMPORTS

	Twelve Months Ending Dec. 1939 Quantity	Dollars	Twelve Months Ending Dec. 1938 Quantity	Dollars
Pigments, Paints, and Varnishes—Cont'd				
Mineral earth pigments:				
Iron oxide and hydroxide, dut lb.	16,913,722	477,134	10,043,546	323,703
Ochers and siennas, dut lb.	9,703,804	157,660	6,674,715	104,586
All other, dut	....	214,119	....	265,062
Chemical pigments:				
Lithopone and other zinc sulfides, dut lb.	5,282,175	130,893	7,863,575	207,121
Zinc oxide and leaded zinc oxide, dut lb.	3,101,129	145,916	1,290,239	73,487
All other, dut lb.	1,354,656	228,075	1,292,346	156,601
Paints, stains, and enamels, dut	....	148,032	....	218,376
Varnishes, dut gal.	6,021	17,043	8,121	19,354
FERTILIZERS AND MATERIALS tons	1,373,069	32,455,478	1,553,542	36,496,039
Nitrogenous:				
Ammonium sulfate, free, tons	110,761	2,987,118	120,837	3,088,156
Ammonium nitrate mixtures (not containing phosphoric acid or potash), free tons	65,710	1,809,698	67,497	1,893,838
Calcium cyanamid or lime nitrogen, free tons	132,698	3,173,927	119,120	2,996,212
Calcium nitrate, free tons	19,255	553,405	28,356	787,382
Guano, free tons	5,151	211,941	15,199	717,817
Dried blood, free tons	13,847	578,266	6,115	266,007
Sodium nitrate, free tons	604,390	11,213,445	577,130	10,731,678
Urea and calurea, free tons	836	84,997	1,817	176,087
Other nitrogenous, free tons	138,181	4,052,936	126,042	3,187,545
Phosphates:				
Animal carbon and precipitated bone, free tons	2,591	73,734	22,966	492,533
Other phosphates, free tons	21,143	368,670	26,450	414,479
Potash fertilizers:				
Chloride, crude, free tons	84,301	2,313,574	199,378	5,371,600
Xainite, free tons	18,654	155,156	53,762	525,757
Manure salts, free tons	1,855	22,216	8,187	112,713
Sulfate, free tons	48,172	1,623,889	65,190	2,192,510
Nitrate (saltpeter), free tons	57,703	1,636,189	52,805	1,652,248
Other potash-bearing substances, free tons	133	1,201	164	1,373
Fertilizer compounds, containing nitrogen, phosphoric acid, and potash, free tons	2,794	185,156	7,384	347,401
All other, free tons	44,894	1,409,960	55,143	1,540,703
EXPLOSIVES	....	409,924	....	654,818
Powder and other explosives, n.e.s., dut	....	17,146	....	9,863
Firecrackers, dut lb.	2,966,489	377,452	4,307,681	613,018
Fireworks and ammunition, dut	....	15,326	....	31,937
SOAP AND TOILET PREPARATIONS	....	3,015,203	....	2,408,977
Soap:				
Castile, dut lb.	925,301	97,302	1,037,232	110,305
Toilet, dut lb.	697,083	196,998	540,735	164,114
Other, dut lb.	1,805,893	185,241	1,416,110	144,007
Perfume materials, free lb.	7,741	862,308	5,174	639,690
dut	....	1,120,349	....	812,964
Miscellaneous				
ANIMAL OILS, FATS AND GREASES, INEDIBLE	....	5,497,871	....	5,524,208
Whale oil, dut gal.	2,705,162	651,739	2,942,971	924,832
Cod oil, free gal.	2,161,940	602,290	3,057,860	939,481
Cod-liver oil, free gal.	6,670,274	3,730,985	5,218,637	3,326,496
Other fish oils, dut gal.	127,998	165,565	70,820	106,396
Wool grease, dut lb.	4,177,707	194,447	1,786,046	100,969
Tallow, dut lb.	1,496,474	43,719	1,229,194	49,774
Seal oil, dut gal.	....	....	35	57
Stearic acid, dut lb.	1,277,662	106,799	787,952	68,797
Oils, fats and greases, n.e.s., dut	....	2,327	....	7,406
GUMS, RESINS, AND BALSAMS, N.E.S.	....	14,338,087	....	8,584,151
Damar, free lb.	17,334,581	796,399	11,541,965	747,110
Kauri, free lb.	1,020,632	119,576	767,014	81,412
Lac, crude, seed, etc., free lb.	23,215,039	1,400,685	15,154,460	992,251
Shellac, unbleached, free lb.	27,682,235	2,197,889	12,374,702	1,089,551
Shellac, bleached, free lb.	135,732	21,863	178,196	27,139
Other varnish gums, free lb.	23,941,313	1,158,278	16,494,033	715,837
Tar, pitch, and turpentine, dut	....	146,050	....	111,324
Chicle, crude, free lb.	14,679,050	5,151,455	7,871,834	2,456,969
Balsams, crude, dut lb.	470,583	130,698	395,968	121,664
Arabic or senegal, dut lb.	9,199,623	634,610	8,693,447	539,914
Tragacanth, free lb.	3,064,676	1,264,499	1,074,100	594,577
Kadaya (Karaya) and talka, free lb.	7,661,622	574,725	4,780,971	522,013
Other gums and resins	....	741,360	....	584,390
VEGETABLE OILS AND FATS, EDIBLE, lb.	128,727,417	10,711,922	206,033,080	15,970,282
Cacao butter, dut lb.	353,444	16,105	10,069	2,292
Sunflower oil, dut lb.	....	....	2,243	114
Corn or maize oil, dut lb.	13,626,024	626,082	22,241,765	1,289,903
Cottonseed oil, dut lb.	29,454,225	1,024,778	77,500,218	3,410,551
Olive oil in packages:				
Less than 40 lb., dut lb.	25,121,303	3,367,993	30,700,604	4,353,368
40 lb. and over, dut lb.	37,744,925	4,708,675	40,385,223	5,432,412
Palm-kernel oil, dut lb.	1,911,060	65,492	2,383,028	86,911
Peanut oil, dut lb.	3,779,415	174,885	15,553,395	610,695
Other edible oils, dut lb.	16,737,021	727,912	17,256,535	784,036

A Complete Check-List of Products, Chemicals, Process Industries

Agricultural Chemicals

Process preparing canned rice product comprises cooking 9-12% dry rice in 30-40% fruit pulp of an acid character at temp. 212° F. for 12-13 minutes. No. 2,187,718. Paul C. Wilbur, San Jose, Calif.

Selective Herbicide. No. 2,188,734. Monsanto, Chemical Co.

Improvement in growth of mushroom mycelium by use of substrate containing soluble alkali substance sufficient to remove acid conditions and metallic salt buffer to prevent alkali from injuring the growth. No. 2,189,303. Louis F. Lambert.

Manufacture protein from soy beans. No. 2,190,644. West Virginia Pulp & Paper Company.

Anti-Parasitic spray for application to plants. No. 2,190,673. John W. Orelup.

Parasiticide for controlling plant parasites and method of preparation. No. 2,190,702. Endowment Foundation.

Process influencing growth of plants comprises applying combination of fluorescent dyestuff and a metal salt. No. 2,190,890. Big Mc's Photosensin Mfg., Inc.

Cellulose

Gelatinized nitrocellulose composition having incorporated therein a salt of dimethyl-phosphoric acid. No. 2,188,322. Imperial Chemical Industries, Ltd.

Production crinkled sheet material containing cellulose acetate. No. 2,188,386. Celluloid Corp.

Production crinkled sheet material containing reconstituted or regenerated cellulose. No. 2,188,387. Celluloid Corp.

Purification organic substitution derivatives of cellulose. No. 2,188,392. Celanese Corp.

Means for supporting cellulose acetate or other thermoplastic material in sheet form during treatment in which material is softened by heat and shaped over a mold. No. 2,189,006. William Victor Hutchinson.

Composition comprising cellulose derivative compositions. No. 2,189,337. Dow Chemical Company.

Process making flexible sheeting from solution containing cellulose acetate butyrate. No. 2,189,590. Eastman Kodak Co.

Production improved artificial materials comprises treating materials produced by saponification of cellulosic filaments with water-soluble organic, nitrogenous base. No. 2,189,918. Celanese Corp. of America.

Process pulping raw cellulosic material. No. 2,190,194. Brown Company.

Process treating wood cellulose to attain predetermined color and viscosity. No. 2,190,274. The Cellulose Research Corp.

Method applying scroop to prefinished cellulose textile material. No. 2,190,331. The Richards Chemical Works.

Regenerated cellulosic derivative of improved moisture resistance. No. 2,190,445. E. I. du Pont de Nemours & Co.

Method esterification cellulose. No. 2,190,450. E. I. du Pont de Nemours & Co.

Preparation ethoxyethylcellulose soluble in water, alkali and organic solvents. No. 2,190,451. E. I. du Pont de Nemours & Co.

Emulsions of cellulose derivatives. No. 2,190,705. E. I. du Pont de Nemours & Co.

Process coloring material made of or containing organic derivative of cellulose. No. 2,191,040. Eastman Kodak Co.

Chemical Specialty

Therapeutic product comprising a stable composition of finely ground maggots in solution and an acid antiseptic medium. No. 2,187,766. Standard Chemical and Mineral Corp.

Apparatus for dialyzing liquids and collection of the colloid particles. No. 2,187,818. I. G. Farbenindustrie Aktiengesellschaft.

Process producing pressed yeast, consisting in centrifuging molasses untreated with chemicals and afterwards subjecting clarified molasses to fermentation. No. 2,187,990. Peter Steinacker.

Inorganic aerogel compositions. No. 2,188,007. Samuel S. Kistler.

Process concentrating vitamins from fish press water. Includes steps of precipitating protein by use of alum filtering and recovering vitamins from filtrate. No. 2,188,008. Philip R. Park, Inc.

Method investigation of materials with neutrons comprises causing beam to impinge on layer of fluorescent substance having associated therewith a thin layer of material selected from group consisting of lithium boron. No. 2,188,115. I. G. Farbenindustrie Aktiengesellschaft.

Cleaning preparation consisting mainly of crushed limestone of various particle sizes. No. 2,188,140. Arthur J. Widmer, assignor of forty-two one-hundredths to Mary Elizabeth Widmer.

Adhesive for use as modifying composition for gelatinous materials comprising fused sugar and glycerine mixture. No. 2,188,099. Minnesota Mining & Manufacturing Co.

Method improving taste of coffee by use of ultra-violet rays. No. 2,188,179. Gwynn Evans, St. Louis, Mo.

Process continuously cultivating yeast by circulating nutrient solution. No. 2,188,192. Heinrich Scholler and Max Seidel.

Fermentation process treating sugar worts comprises treating cellulose with dilute acid by percolation under pressure. No, 2,188,193. Heinrich Scholler.

Method and composition for improved wheat flour by use of benzoyl peroxide and powdered alkali metal salt of fatty acid. No. 2,188,247. Frederick H. Penn.

Cutting lubricant comprising lubricating composition intimately admixed with solution of uncombined sulfur in a non-volatile oil soluble naphthalenic compound. No. 2,188,255. Continental Oil Co.

Process for resolution of emulsions comprises subjecting emulsion to vibratory effects emanating from a rare gas tube in presence of absorbent material. No. 2,188,269. The Neon Research Corp.

Polymerization of drying oils, step of passing SO_2 gas through the hot oil at a rapid controlled rate thus effecting intimate contact between SO_2 and oil. No. 2,188,273. Imperial Chemical Industries, Ltd.

Composition for stopping leaks comprises aqueous solution water soluble alkali metal silicate and water soluble inorganic metal salt, normally fluid but transformable into semi-rigid gel upon subjection to electrolysis. No. 2,188,311. Thomas Griswold, Jr., and James W. Rebbeck, both of Midland, Mich.

Non-Carbonizing arc resistant sheet material comprising laminations of mica and resin material. No. 2,188,317. Ellsworth F. Seaman.

Vitamin composition comprising solid absorbent material containing vitamin A and extract of a cereal providing vitamin B. No. 2,188,319. One-half, McKesson & Robbins, Inc., and one-half, The Vitab Corp.

Manufacture remoistening gummed tape. No. 2,188,329. Stein, Hall Mfg. Co.

Preparation abrasive article comprises application of abrasive grains to flexible base. No, 2,188,341. Behr-Manning Corp.

Method impregnating a product with liquid by condensing saturated vapor on said product. No. 2,188,371. The Guardite Corporation.

Apparatus for forming mineral wool. No. 2,188,373. Johns-Manville Corp.

Laminated safety glass. No. 2,188,395. Libbey-Owens-Ford Glass Company.

Composition for preserving protein-containing materials. No. 2,188,468. Charles M. Albion.

Food composition. recipe for honey biscuits. No. 2,188,481. Corn Products Refining Co.

Non-smudging transfer sheet to be used in same way as carbon paper, comprises transferable composition coated with resin film. No. 2,188,538. Ditto, Inc.

Carbon solvent and lubricant, composition of matter suitable for adding to motor fuels, lubricating oils and grease. No. 2,188,645. Roy L. Buffington.

Method recrystallizing silicon carbide resistor to produce resistor having relatively low resistance at room temperature. No. 2,188,693. The Carborundum Co.

Vibration-absorbing cushion bearing having a non-metallic fabric lining. No. 2,188,722. General Motors Corp.

Portland type cement to which has been added a solution of caustic alkali and a material of the class consisting of humic, gallic, tannic, quercitannic and lignic acids. No. 2,188,767. Standard Oil Development Company.

Candle and fuel composition for candles. No. 2,188,795. The A. I. Root Company.

Stick for protecting silk and rayon garments. comprises 1 lb. paraffin, 1-2 drams arabic, ten drops oil of lavender. No. 2,188,796. Carolyn S. Richards and Ruth S. Richards.

Substantially anhydrous lubricating grease comprising lubricating oil, substantial quantity oil-soluble soap. No. 2,188,863. Sun Oil Company.

Substantially anhydrous block grease having A.S.T.M. penetration of 90 at 77° F. comprising lubricating oil having flash point 400° F. and a mixture of soaps. No. 2,188,864. The Sun Oil Co.

Oily material dispersable in water and of the class consisting of oils, fats, and waxes. No. 2,188,887. Edwin T. Clocker.

Substantially non-aqueous zein solution comprising one part by weight zein two parts ethylene glycol. No. 2,188,895. The Zein Corporation of America.

Process for application of reagents in counter-current extractions. No. 2,188,919. Government of the U. S. of America, as represented by the Secretary of Commerce and his successors.

Process making refractories. No. 2,188,921. Francois Richard.

Insecticide and fungicide containing as active ingredients complex copper salts of sulfurized cresylic acid and naphthenic acids. No. 2,188,951. The Richards Chemical Works, Inc.

Chocolate and method of production by treating butterfat containing chocolate to effect a uniform, stable dispersion. No. 2,189,144. John L. Klewer.

Opacifier for use in porcelain enamels comprising preformed product of general formula $Sb_2O_5.TiO_2.2CaF_2.2\frac{1}{2}CaO$. No. 2,189,148. Ferro Enamel Corporation.

Process determining moisture content of lengths of material by measuring electrical conductivity. No. 2,189,352. M. Rudolf Jahr.

Production asphalt composition from soda asphalt obtained as a residue from distilling mineral oil in presence of excess NoOH. No. 2,189,379. Shell Development Co.

Preparation dry egg albumen. No. 2,189,380. Armour and Company.

Foil covered, reinforced, laminated sheet material. No. 2,189,409. Alfol Insulation Company, Inc.

Method retarding deterioration of organic substance through oxidation by use of a diarylamine. No. 2,189,411. B. F. Goodrich Co.

Method retarding deterioration of organic substance through oxidation by use of metallic salt of an aminophenol. No. 2,189,417. B. F. Goodrich Co.

Artificial filaments of hardened coagulated proteins. No. 2,189,481. Imperial Chemical Industries, Ltd.

Production disinfectant and wound remedy. No. 2,189,564. Arnold Frenkel.

Insecticide having as essential ingredient a halogenated organic compound. No. 2,189,570. Free use of the people of the U. S. of America.

Welding process. No. 2,189,595. Haynes Stellite Co.

Manufacture lubricating greases including step of mixing soap and mineral oil. No. 2,189,661. Continental Oil Company.

Process comprising reaction of phosphorous oxychloride upon digitoxine. No. 2,189,723. Winthrop Chemical Corp., Inc.

Production vermin killers. No. 2,189,730. Alfred Esch.

Abrasive body comprises abrasive grains bonded with polymerized methyl methacrylate and ethylene glycol dimethacrylate. No. 2,189,733. Norton Company.

Abrasive grains bonded with copolymer of methyl methacrylate and methacrylic acid. No. 2,189,734. Norton Company.

Abrasive bonded with methyl methacrylate copolymerized with allyl methacrylate. No. 2,189,735. Norton Company.

Manufacture modified heat-bodied oil products from fatty oils. No. 2,189,772. J. Randolph Newman.

Non-corrosive lubricant having incorporated small amount free aliphatic amine and organic nitro reducing compound. No. 2,189,788. Michael W. Freeman.

Method thickening solutions of interface modifier having lipophile group of at least 8 C atoms and a hydrophile group. No. 2,189,803. The Emulsol Corporation.

Composite pneumatic material having elastic body with air pockets. No. 2,189,813. Airfilm Corporation.

Photographic emulsion comprising ether of general formula R-O-R' where R and R' are alicyclic and aromatic hydrocarbon radicals respectively. No. 2,189,817. Du Pont Film Manufacing Corp.

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U. S. Chemical Patents

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Production substantially dry, solidified, starch conversion syrup product. No. 2,189,824. American Maize-Products Company.
Tripack or photographic film having three elements. No. 2,189,837. Du Pont Film Manufacturing Corp.
Process treating mineral oil containing asphalt comprises extracting same with mixture comprising selective solvent of phenol type and halogenated hydrocarbon. No. 2,189,884. Standard Oil Development Co.
Stable emulsion comprising 30% alcohol, a mineral oil, gum emulsifier, a polyisobutylene, water and a substance giving composition pH between 5-9. No. 2,189,854. Standard Oil Development Co.
Cohesive aluminum soap grease. No. 2,189,873. Standard Oil Development Co.
Manufacture selenium rectifier cells. No. 2,189,908. International Standard Electric Corp.
Improvement in preparation pour point depressors of condensation type prepared by chemical condensation of chlorinated paraffin wax with aromatic hydrocarbon in presence of $AlCl_3$. No. 2,189,924. I. G. Farbenindustrie Aktiengesellschaft.
Process sterilizing comprising subjecting material to heat, then vacuum chamber and then atmosphere of ethylene oxide. No. 2,189,947. The Griffith Laboratories, Inc.
Method treating pancreatin to reduce bacterial and mold count by use of ethylene oxide. No. 2,189,948. The Griffith Laboratories, Inc.
Method sterilizing normally dry water-dispersible colloid materials with retention of a useful viscosity. No. 2,189,949. The Griffith Laboratories, Inc.
Method sealing glass to preformed metal body of an alloy of iron nickel and cobalt. No. 2,189,970. Radio Corporation of America.
Method compounding chewing gum base containing a lastic and a resin. No. 2,190,021. Frank A. Garbutt.
Method resolving emulsion of aqueous solution of NaCl in an aromatic alkyl thiocyanate. No. 2,190,022. Rex Research Corp.
Manufacture animal food material from lettuce. No. 2,190,176. National Oil Products Co.
Process incorporating with dry chewing gum material, a dry undissolved water-soluble oil-insoluble dyestuff which upon wetting with saliva develops a strong color. No. 2,190,180. Sweets Laboratories, Inc.
Stable hormone suspension comprises preparation of gonadotropic hormone of anterior lobe of the hypophysis and physiologically innocuous oil. No. 2,190,183. Winthrop Chemical Company.
Method of introducing a flavoring ingredient into a frozen comestible. No. 2,190,226. Armstead M. Alexander.
Method preparing and applying adhesive comprises bringing together urea-formaldehyde condensation product, a hardening agent, and polyhydric phenol in aqueous solution, containing free formaldehyde and applying resulting adhesive before it hardens. No. 2,190,239. Plaskon Company, Inc.
A glass-metal seal comprising vitreous container and hallow metal tube having its outer wall sealed in said container. No. 2,190,302. Fides Gesellschaft fur die Verwaltung und Verwertung von gewerblichen Schutzrechten mit beschrankter Haftung.
Manufacture remoistening adhesive. No. 2,190,372. Old Colony Envelope Co.
Sanitary powder puff comprising closed cell gas expanded soft rubber. No. 2,190,376. The Sponge Rubber Products Co.
Production keto gulonic acid from sorbose comprises reacting solution of sorbose with O_2. No. 2,190,377. Merck & Co., Inc.
Production oxidation products of normally liquid aliphatic hydrocarbons comprises subjecting said hydrocarbons to oxidizing action of HNO_3 in presence of O_2. No. 2,190,453. William H. King and Clyde O. Sheely, said King assignor to said Sheely.
Refractory carbide composition, 1-50% zirconium and balance essentially silver. No. 2,190,477. P. R. Mallory & Co., Inc.
Method of processing soap. No. 2,190,591. Benjamin Clayton.
Apparatus and process for producing soap of desired moisture content. No. 2,190,592. Benjamin Clayton.
Process refining animal and vegetable oils. Nos. 2,190,593-594. Refining, Inc.
Digestion sewage sludge, trade wastes comprises subjecting sludge to anaerobic thermophilic organism activity. No. 2,190,598. The Dorr Company, Inc.
Preparation slow-breaking mixing emulsion of difficultly emulsifiable pyrogenous residue of organic substances. No. 2,190,604. American Bitumuls Company.
Method for making and processing soap. No. 2,190,615. Refining, Inc.
Method lubricating bearings surfaces in internal combustion engines. No. 2,190,648. Gulf Oil Corporation.
Production solid talloel rosin from crude talloel soap of sulfate block liquor. No. 2,190,660. Torsten Hasselstrom.
Process and apparatus for treating yeast. No. 2,190,689. Emulsions Process Corp.
Extreme pressure lubricant comprising lubricating oil containing alkyl benzene dichlor phosphine. No. 2,190,715. The Sun Oil Co.
Antiseptic preparation comprising compound solvent and ortho-phenyl phenol. No. 2,190,749. Samuel Brass.
Production washing and cleansing agent composed of salt pyrophosphoric acid ester of high molecular alcohol and a portion of unreacted alcohol. No. 2,190,769. American Hyalsol Corp.
Polymerizable liquid product obtained by reacting methacrylic anhydride with incompletely esterified polyhydric alcohol. No. 2,190,789. E. I. du Pont de Nemourss & Co.
Means for applying adhesive to one side of moving tape. No. 2,190,-809. Minnesota Mining & Manufacturing Co.
Method comminuting fusible materials such as sulfur. No. 2,190,922. The Dow Chemical Co.
Process for electrothermal pyrolysis of carbon-bearing liquid. No. 2,191,012. E. I. du Pont de Nemours & Co.
Preparation photographic gelatin having iso-electric point in region pH 6-9. No. 2,191,034. Eastman Kodak Co.
Color forming photographic developer containing amines. No. 2,191,037. Eastman Kodak Co.
Photographic color film and apparatus. No. 2,191,038. Eastman Kodak Co.
Manufacture acid resistant, water insoluble, granular, ion-exchanging material. No. 2,191,059. The Permutit Company.
Preparation carbonaceous zeolite. No. 2,191,060. The Permutit Company.
Manufacture absorbent and ion exchange materials. No. 2,191,063. N. V. Octrooien-Maatschappij.
Process for dewaxing mineral oil by use of selective solvent comprising furfural and a secondary or tertiary alcohol. No. 2,191,136. Shell Development Co.
Abrasive detergent composition containing alkali-metal salt of group consisting of soluble metaphosphate and tri-polyphosphate. No. 2,191,199. Hall Laboratories, Inc.
Process removing calcium magnesium or iron impurities from gelatin and casein. No. 2,191,206. Hall Laboratories, Inc.
Method producing negative electrode for lead-acid storage batteries. No. 2,191,231. Anna P. Hauel.
In continuous extraction system, process continuously removing from solvent treated materials, solvents of lower sp. gr. No. 2,191,255. Extractol Process, Ltd.
Preparation egg white product. No. 2,191,257. Armour and Company.
Insecticides comprising diazoamino compound free from sulfonic acid and carboxyl groups. No. 2,191,259. Winthrop Chemical Co., Inc.
Method obtaining cholesterol from animal tissue. No. 2,191,260 Armour and Company.
Production bituminous road building materials. No. 2,191,295. I. G. Farbenindustrie Aktiengesellschaft.
Insecticides (1) containing iodoxybenzene, (2) containing O-iodoxy-nitrobenzene. No. 2,191,299. Henry A. Wallace, as Secretary of Agriculture of the U. S. of America, and his successors in office.
Insecticide (1) containing iodosobenzene, (2) containing O-iodosonitrabenzene. No. 2,191,300. Henry A Wallace, as Secretary of Agriculture of the U. S. of America and his successors.
Insecticides (1) containing phenyliodoxchloride, (2) containing O-nitrophenyliodochloride. No. 2,191,301. Henry A. Wallace, as Secretary of Agriculture of the U. S. of America, and his successors.
Drilling fluid comprising suspension of clay in mixture of water and glycerol. No. 2,191,312. Standard Oil Development Co.
Method for filtering. No. 2,191,403. Sun Oil Company.
Insecticidal dust of walnut shell flour with insecticidal toxicant selected from class of extracts of rotenone and pyrethrin-bearing plants. No. 2,191,421. Government and the people of the U. S.
Dissolving, softening and gelatinizing agent. No. 2,191,428. Deutsche Hydrierwerke Aktiengesellschaft.

Coal Tar Chemicals

Process obtaining products from lignite tar, shale tar, peat tar and the like, comprises topping said tar for constituents boiling below 260° C. and subjecting residue to selective solvents. No. 2,188,015. Deutsche Erdol-Aktiengesellschaft.
Pyridine carboxylic acid morpholides. No. 2,188,244. Fabriques de Produits de Chimie Organique de Laire.
Anthraquinone compound containing no sulfonic acid group or carboxylic acid group in anthraquinone nucleus and having an alkylene sulfonic acid attached to anthraquinone nucleus through N atom. No. 2,188,369. Eastman Kodak Company.
Production modified coal tar comprising refined coal tar modified with gasoline-insoluble resin and minor amount of $AlCl_3$. No. 2,188,478. Hercules Powder Co.
Method separating non-paraffinic copounds from normally liquid hydrocarbon mixture. No. 2,188,531. E. I. du Pont de Nemours & Co.
Process for effecting carbazole ring formation of compounds of anthraquinone series comprises fusing secondary aromatic amine with aluminum chloride. No. 2,187,815. General Aniline Wks., Inc.
Preparation derivatives of cyclypentanopoly-hydrophenanthrene. No. 2,188,870. Winthrop Chemical Company.
Process for conversion into oxidized form of leuco derivatives of anthraquinone compound. No. 2,189,012. Celanese Corporation of America.
Hydroxy carboxylic acid of diphenylene sulfide by reaction of CO_2 on 3-hydroxy-diphenylenesulfide in presence of alkali. No. 2,189,367. General Aniline & Film Corp.
Sulfurized polymer of dihydronaphthalene. No. 2,189,468. William Hoffman Kobbe.
Production l-ascorbic acid comprises treating diacetone-keto-gulonic acid with HCl. No. 2,189,830. Merck & Co., Inc.
Production polynuclear compounds comprises mechanically freeing a product obtained by destructive hydrogenation of mineral coal. No. 2,190,191. I. G. Farbenindustrie Aktiengesellschaft.
Production of gas of predetermined ratio of H to CO from bituminous fuels. No. 2,190,293. Koppers Company.
Method purifying crude salicylaldehyde which contains phenol. No. 2,190,607. The Dow Chemical Co.
Manufacture alkyl substituted aryl sulfate of benzene and naphthalene series. No. 2,190,733. E. I. du Pont de Nemours & Co.
Anthraquinone compounds and process of coloring with them. No. 2,191,029-030. Eastman Kodak Company.

Coatings

Wax covering for food products comprising a ductile and tacky inner layer in contact with product consisting essentially of amorphous petroleum wax and a firm non-tacky outer layer essentially of paraffin wax. No. 2,187,734. Edward C. Ennis, Chicago, Ill.
Method adhering rubber to a member of metals consisting of brass, copper, and cobalt by use of sulfur at the interface. No. 2,188,434. B. F. Goodrich Co.
Process of coating material which will react with an acid. No. 2,188,-884. Edwin T. Clocker.
Preparation coating compositions comprises wax colloidally dispersed in oil. No. 2,189,530. E. I. du Pont de Nemours & Co.
Production hard surface on ferrous metal by applying layer of silicon carbide. No. 2,190,050. The Solvay Process Company.
Method facing steel slab with coating of cladding metal. No. 2,190,310. Clad Metals Industries, Inc.
Method making containers of fibrous material coated with thermoplastic adhesive. No. 2,190,479. Humoco Corporation.
Plastic or coating composition comprising substantially non-volatile, chlorine-containing resin. No. 2,190,776. E. I. du Pont de Nemours & Co.

Dyes, Stains, etc.

Vat dyestuff of the quinazoline series. No. 2,187,812. General Aniline Wks., Inc.
Dyestuff, phthaloyl quinazolines containing at least one substituted amino group attached to a carbon atom of the heterocyclic nucleus. No. 2,187,813. General Aniline Wks., Inc.

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Dyestuff-sulfonic acids of the dioxazine series which dyes animal and vegetable fiber and viscose artificial silk a clear blue tint. No. 2,187,853. General Aniline Wks., Inc.

Sulfur dyestuffs obtained by action of alkali metal polysulfide on members of group consisting of a leucoindophenol, which dye vegetable fibres bright blue to greenish shades with good fastness to light. No. 2,188,102. General Aniline Works, Inc.

Di-benzanthrone-anthraquinone-di-acridines, dyestuffs. No. 2,188,537. E. I. du Pont de Nemours & Co.

Vat dyestuffs of the benzanthrone-anthraquinone acridine series. No. 2,188,538. E. I. du Pont de Nemours & Co.

Leather dyed with easily soluble mono-azo dyestuff derived from a compound of group consisting of α-and β-naphthylamines. No. 2,188,774. General Aniline Works, Inc.

Dyestuffs of the anthraquinone series, anthrimide-carbazole type vat dyestuff which dissolves in concentrated H_2SO_4 with red color and dyes cotton from dark red vat in bluish brown shades. No. 2,188,776. E. I. du Pont de Nemours & Co.

Sensitizing composition for blue print paper comprises aqueous solution of ferric alkali metal salt of organic acid and hydroxyl amine salt of polybasic acid. No. 2,188.900. B. K. Elliott Company.

Az dyestuff of general formula: A-N=N-B, where A is diazo radical of benzene series and B is a member of group consisting of succinylamino naphthol sulfonic acids. No. 2,189,262. General Aniline & Film Corp.

Acid wool dyestuffs of the anthraquinone series. No. 2,189,509. General Aniline and Film Corporation.

Production polyazo dyestuffs and industrial products resulting therefrom. No. 2,189,522. Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reunies, Etablissements Kuhlmann.

Preparation cyanine dye containing polymethenyl chain. No. 2,189,599. Eastman Kodak Co.

Method stabilizing natural green color of vegetables. No. 2,189,774. American Can Company.

Azo dyes. No. 2,189,806. E. I du Pont de Nemours & Co.

Azo dyestuffs. No. 2,190,172. General Aniline & Film Corp.

Manufacture stable, water-soluble azo dyestuffs. No. 2,190,746. General Aniline & Film Corp.

Water soluble polyazo dyestuffs. No. 2,190,750. General Aniline & Film Corporation.

Vat dyestuffs of anthraquinone series. No. 2,190,751. General Aniline & Film Corp.

Process dyeing organic derivatives of cellulose. No. 2,190,825. E. I. du Pont de Nemours & Co.

Process improving dyeings of organic dyestuffs containing free acid groups. No. 2,190,848. General Aniline Film Corp.

Azo dyestuffs. No. 2,191,094. U. S. Industrial Alcohol Company.

Azo dyestuffs insoluble in water useful for manufacture orange color lakes. No. 2,191,103. General Aniline & Film Corp.

Equipment and Apparatus

Apparatus introducing foam stabilizing material into stream of water. No. 2,188,066. Pyrene-Minimax Corp.

Tanks for use in systems for biological clarification and purification of sewage by aerobic bacteria. No. 2,188,162. Henry B. Schulhoff.

Acetylene generator comprising a tank adapted to contain water in its lower portion and to form a gas collecting chamber in its upper portion. No. 2,188,277. Oxweld Acetylene Company.

Tank and flow and pressure regulating apparatus for butane. No. 2,188,597. John R. Holicer.

Filtering apparatus for liquids. No. 2,188,673. Extractol Process, Ltd.

Electric precipitator comprising discharge electrode, two non-discharge electrodes and means for alternately establishing electric field between discharge electrode and each said non-discharge electrodes. No. 2,188,695. Research Corp.

Device for retarding flow of liquid under pressure. No. 2,188,761. Quiet Flow Devices, Inc.

Multiple heat exchange unit comprising spaced headers. No. 2,188,975. Borg-Warner Corp.

Apparatus for cooling and degasifying liquids. No. 2,189,146. Edward Little.

Apparatus for crushing or grinding ore. No. 2,189,441. John W. Bell.

Ozone control for electrostatic precipitator. No. 2,189,614. Westinghouse Electric and Manufacturing Co.

Apparatus for dry generation of acetylene. No. 2,189,762. The Prest-O-Lite Co., Inc.

Emulsifying unit in flotation apparatus. No. 2,189,779. Mining Process and Patent Company.

Method and apparatus for making glass wool. No. 2,189,822. Owens-Corning Fibreglass Corp.

Test tube holder. No. 2,189,989. Sol Sydney Lichtman.

Apparatus for manufacture of glassware. No. 2,190.042. Crown Cork & Seal Co., Inc.

Apparatus for manufacture of casein. No. 2,190,136. United States Gypsum Company.

Oil separator for refrigeration systems. No. 2,190,138. Kenmore Machine Products, Inc.

Glass connections for chemical apparatus. No. 2,190,220. Ace Glass Incorporated.

Heat exchanger in apparatus for drying sludge. No. 2,190,234. G. Polysius, Aktiengesellschaft.

Method and apparatus for melting rock and making products therefrom. No. 2,190,271. Johns-Manville Corp.

Automatic acetylene gas generator. No. 2,190,272. Rolland C. Sabins.

Apparatus for removing Glauber's salt from concentrated solutions thereof. No. 2,190,280. E. I. du Pont de Nemours & Co.

Gas generating apparatus in fuel-supply system. No. 2,190,366. American Gas Service Co.

Apparatus for carrying out catalytic reactions on fluids. No. 2,190,548. The Research Trust Limited.

Apparatus and process for treating liquid containing flocculatable material. No. 2,190,596. The Dorr Company, Inc.

Glass cutting machine. No. 2,190,641. George W. Burroughs.

Agitation vessel in froth-flotation machine. No. 2,190,852. Minerals Separation North American Corp.

Filter, means and method of making same. No. 2,190,886. Airmaze Corp.

Combustion chamber for lignite and semibituminous coal. No. 2,190,-973. Oliver S. Bowman.

Distributing manifold for bottle washing machine. No. 2,191,002. George Volkert.

Air cleaner in which water and impurities are separated by centrifugal force. No. 2,191,187. R. C. Mahon Company.

Flow control apparatus in liquid dispensing system. No. 2,191,194. S. F. Bowser & Company.

Pressure regulating valve. No. 2,191,319. Joseph F. Jaworowski assignor of 25 one-hundredths to Sam W. Emerson.

Method and apparatus for drawing gaseous fluids from receptacle. No. 2,191,345. E. Leybold's Nachfolger Kommandit-Gesellschaft.

Explosives

Manufacture progressive burning smokeless powder characterized by nearly complete freedom from progressive penetration of the powder grains by deterrent coating when powder is aged under normal storage conditions. No. 2,187,866. Hercules Powder Co.

Explosive composition comprising solid dispersion of oxygen-accepting ingredient in inorganic salt of acid taken from group consisting of chloric and perchloric acids. No. 2,190,703. E. I. du Pont de Nemours & Co.

Fine Chemicals

Derivatives of hexamethylene-dithio-carbonic acid, having a saturated carbon chain of six carbon atoms the terminal carbon atoms of which are singly bonded to N. No. 2,187,719. E. I. du Pont de Nemours & Co., Inc.

Compound from the group consistng of (1) primary amines having formula $R\text{-}O\text{-}R'\text{-}NH_2$ where R represents a xenyl radical and R' represents a lower alkylene group and (2) hydrochlorides thereof. No. 2,187,723. The Dow Chemical Co.

Barbituric Acid Compound. No. 2,187,728. E. R. Squibb & Sons.

Compound of copper phthalocyanine trisulfonic acid and an amine obtained from fatty acids contained in palm kernel oil. No. 2,187,816. General Aniline Wks., Inc.

High molecular organic compound. No. 2,187,819. General Aniline Wks., Inc.

Method recovering primary aromatic amines from reaction mixture containing amine and iron sludge. No. 2,187,820. Cyanamid Co.

Process comprises reaction of titanium tetrahalides with a hydrocarbon hydroxy compound in presence of nitrogen containing compound. No. 2,187,821. I. G. Farbenindustrie A. G.

Process separating high molecular mixture into portions having different properties comprising steps of subjecting mixture to the precipitating action of a quantity of a low molecular agent which is incapable of reacting chemically with the high molecular weight mixture. No. 2,188,102. Shell Development Co.

Process separating water-immiscible, high molecular weight mixture comprises subjecting mixture to precipitating action of single treating agent which is immiscible with water at ordinary temperature, has a low molecular weight and possesses a critical temperature below 350° C. under paracritical conditions for said agent. No. 2,188.045. Shell Development Co.

Piezoelectric material comprising a crystalline element of sodium potassium tartrate crystallized from a deuterium oxide solution. No. 2,188,154. Bell Telephone Laboratories, Inc.

Production aqueous solution of an alkene halohydrin having halohydrin concentration greater than in the respective halohydrin-water azeotrope. No. 2,188,254. Shell Development Co.

Manufacture of leuco sulfuric acid esters of the alkylation products of Bz-2, Bz-2'- dihydroxydibenzanthrone. No. 2,188,320. E. I. du Pont de Nemours & Co.

Preparation co-carboxylase comprise reacting alkali metal pyrophosphate, phosphoric acid, and a vitamin B, salt at 100-200° C. No. 2,188,323. Merck & Co., Inc.

Sterine derivatives having the character of sexual hormones and process of preparation. No. 2,188,330. Winthrop Chemical Co.

Process comprising reacting hydrogen cyanide with methyl vinyl ketone to produce levulinonitrile. No. 2,188,340. E. I. du Pont de Nemours & Co.

N-sodium sodium sulfamate, $NaHNSO_3Na$. No. 2,188.351. E. I. du Pont de Nemours & Co.

Production complex metal amine salts. No. 2,188,746. The Martin Dennis Co.

Preparation of 2-keto-alkonic acids from aldonic acids. No. 2,188,777. Charles Pfizer & Company.

Secondary Δ^1-Alkenyl malonic esters and process for production. No. 2,188,874. Sharp & Dohme.

Preparation crystallized derivatives of vitamin E. No. 2,188,878. Winthrop Chemical Co., Inc.

Method isolating a male sex hormone comprises subjecting starting material containing hormone to condensation, isolating resulting condensate, and decomposing same to split off hormone. No. 2,188,881. Schering Corporation.

Process of coagulating proteins in dilute, heat coagulable protein bearing liquors. No. 2,188,908. Buffalo Foundry & Machine Co.

Tablets consisting essentially of sodium pentachlorophenate, moisture content of 3-20% and containing 1-10% NoOH. No. 2.188,944. Monsanto Chemical Co.

Organic Nitrogenous base derivatives of ether derivatives. No. 2,189,-397. Benjamin R. Harris.

Anesthetic, the dialkylaminoalkanol ester of 6-alkoxy pyridine-3 carboxylic acid. No. 2,189,404. Pyridium Corp.

Addition compound of monohydroxy substituted benzene hydrocarbon and a cyclohexylamine. No. 2,189,420. Monsanto Chemical Co.

Unsaturated ether products of general formula $H_2C{=}\overset{O-R}{C}{-}C{=}CH_2$. No. 2,189,529. E. I. du Pont de Nemours & Co., Inc.

Method converting olefinic hydrocarbons to hydrocarbons of higher boiling point by polymerization. No. 2,189,655. The Polymerization Process Corporation.

Organic nitrogenous compounds. No. 2,189,664. The Emulso Corporation.

Dibenzyl hexahydro phthalate. No. 2,189,721. Wingfoot Corp.

Di(alkoxy alkyl)esters of hexahydro phthalic acid. No. 2,189,722. Wingfoot Corp.

Production ascorbic acid from sorbose by reaction aqueous solution of sorbose with oxygen in presence of noble metal catalyst. No. 2,189,-778. Merck & Co., Inc.

Method alkylating phenols with tertiary olefins. No. 2,189,805. Monsanto Chemical Co.

Production optically active isomers of β-methyl choline salts. No. 2,189,808. Merck & Co., Inc.

Salts of alkyl esters of methyl-hydrasteine of group consisting of hydrohalides and alkyl sulfates. No. 2,189,809. Merck & Co., Inc.

Method stabilizing divinyl ether with a polyphenol. No. 2,189,810. Merck & Co., Inc.

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Recovery phthalic acid from gases containing phthalic anhydride. No. 2,190,001. National Aniline & Chemical Co., Inc.

Quaternary ammonium derivatives of alcohol amine compounds. No. 2,190,133. The Emulsol Corporation.

Soluble protamine insulin containing 2.5 mg. to 5 mg. protamine for each 100 units insulin. No. 2,190,137. Frederick Stearns & Company.

Manufacture sulfur nitride. No. 2,190,177. The Harshaw Chemical Co.

A polyethyleneglycol ether of carob bean kernel meal. No. 2,190,179. I. G. Farbenindustrie Aktiengesellschaft.

Process obtaining from urine, a substance capable of lowering the blood pressure. No. 2,190,248. Ernst Wollheim.

Transforming unsaturated carbo-cyclic non-aromatic compound comprises heating under non-catalytic conditions to temp. between 1100°-1500° F. at pressure not over 20 mm. for 1/10–1/50 sec. No. 2,190,369. Process Management Co., Inc.

Manufacture mono-ethers of 2.6-dihydroxy-pyridine-4-carboxylic acid compounds. No. 2,190,444. Mac Dohrn and Hans Nahme.

Production synthetic linear polyamides from tetramethylenediamine and member of class of adipic acid and amide forming derivatives. No. 2,190,770. E. I. du Pont de Nemours & Co.

Diazoamino ether and method of making. No. 2,190,841. National Aniline & Chemical Co.

Di-ester of 1,4-dioxanediol-2,3 and a halogen-substituted carboxylic acid. No. 2,190,907. The Dow Chemical Co.

Ethylene dicinnamate, white crystalline solid, M. P. 89.5° C. No. 2,190,917. The Dow Chemical Co.

Ester of a sulfo-carboxylic acid having from 2 to 4 C atoms with octyl alcohol. No. 2,190,921. The Emulsol Corp.

Purifying low boiling hydrocarbons with P_2O_5. No. 2,191,143. Petroleum Conversion Corp.

Ortho and para-nitro-nitrophenyl-tri-fluoromethyl-sulfoxides, oxidation products thereof, and preparation of same. No. 2,191,062. General Aniline & Film Corp.

Stable aqueous solution of a salt of o-iodohippuric acid. No. 2,191,118. N. V. Orgachemia.

Luminescent material consisting of a cadmium chloro-phosphate with part of Cd replaced by Mn. No. 2,191,351. General Electric Company.

Manufacture 2.4.6-triamino-1,3,5-trazine. No. 2,191,361. Ciba Products Corp.

Carboxylic acid amides of saturated and unsaturated cyclopentanopolyhydrophenanthrene series. No. 2,191,394. Society of Chemical Industry in Basle.

Preparation p-carbamidobenzenesulfonamide. No. 2,191,432. Eli Lilly and Company.

Industrial Chemicals

Process comprising catalytic hydrogeneration of a compound of the class consisting of amides and imides at temperatures of 225° C. and pressure of 10 atoms. No. 2,187,745. E. I. du Pont de Nemours & Co.

Manufacture finely divided lead carbonate from ore containing a compound of lead with an acidic radical. No. 2,189,749. Marvin Metals, Inc.

Method treating ore containing a metallic element and a plurality of other elements with alkali metal to cause formation of water-soluble alkali metal salts and thus effect separation. No. 2,187,750. Marvin Metals, Inc.

Process of producing interpolymerization comprises polymerizing vinyl chloride together with maleic acid ester of a saturated alcohol. No. 2,187,817. I. G. Farbenindustrie Aktiengesellschaft.

Manufacture of pigment comprises subjecting water-soluble complex potassium iron chromate to a temperature 180° - 220° C. at pressure from 10 to 20 atoms in presence of 1-3 parts its quantity by wt. of water. No. 2,187,822. I. G. Farbenindustrie A. G.

Process making olefin oxides comprises direct chemical combination of olefins with molecular oxygen in presence of silver surface catalyst. No. 2,187,882. Carbide & Carbon Chemicals Corp.

Apparatus for continuous solvent extraction. No. 2,187,890. National Distillers Products Corp.

Device in combination with rotary kiln for introducing air into discharge end of kiln. No. 2,187,922. Monolith Portland Cement Co.

Process for separation of molybdenite from copper sulfides comprises subjecting material to flotation operation in presence of molybdenum sulfide depressing agent. No. 2,187,930. Minerals Separation North American Corporation.

Safety device for volatile liquid storage tanks comprising essentially a flame arrester and a plurality of fusible members carried by the cover. No. 2,188,022. John J. Tokheim.

Method making fused silica articles includes depositing finely divided molten silica from high temperature flame upon abutting ends of separable baits and continuously separating baits to elongate the molten mass. No. 2,188,121. Corning Glass Works.

Process polymerization gaseous hydrocarbons comprising subjection gaseous products to action of catalyst consisting of mixture of products taken from groups consisting of phosphates and sulfuric acid. No. 2,188,057. Boris Malishev, 33 1-3% to Universal Development Corp., and 3% to John P. Nikonow.

Method purifying alcohols of the group, ethyl, propyl, and butyl characterized in that the oxidizable impurities are decomposed selectively by action of water soluble manganic salt under acid conditions. No. 2,188,-274. New England Alcohol Company.

Wetting agent for alkaline mercerizing solution. No. 2,188,287. General Aniline Wks., Inc.

Process making aqueous solution containing sulfuric acid from SO_2 comprises passing gas containing SO_2 and O_2 counter-current to dilute aqueous solutions containing manganese and aluminum. No. 2,188,324. John H. Walthall.

Process for removal of foreign particles from gases comprises bringing gas into intimate contact with a fluid. No. 2,188,439. Blaw-Knox Co.

Continuous process for producing polymers from olefins by heat treatment under pressure. No. 2,188,465. Imperial Chemical Industries, Ltd.

Production terpene compound having type formula R-(CNX) where R is a terpene group and X is an element of group consisting of sulfur, selenium and tellurium. No. 2,188,495. Hercules Powder Co.

Process precipitating alkaline earth metal carbonate of fine particle size. No. 2,188,663. Diamond Alkali Company.

Production mineral oil sulfonic acids comprises subjecting mineral oil to sulfonation, adding alkaline solution to neutralize sulfuric acid and separating sulfonic acids by stratification. No. 2,188,770. Sinclair Refining Co.

Method distilling mixtures containing vinyl aromatic hydrocarbons includes step of dissolving sulfur in hydrocarbon mixture to extent of .01-5% sulfur. No. 2,188,772. The Dow Chemical Co.

Production polyvinyl ethers comprises treating a vinyl ether containing basic group in molecule with SO_2. No. 2,188,778. I. G. Farbenindustrie Aktiengesellschaft.

Process drying solutions containing lactose. No. 2,188,907. Buffalo Foundry and Machine Co.

Manufacture carbonyl compound of steroids. No. 2,188,914. Society of Chemical Industry in Basle.

Flotation process for recovery of potassium chloride from sylvinite ores by selective flotation. No. 2,188,932. Potash Co. of America.

Process treating hydrocarbons by subjecting to conversion conditions in a heating zone. No. 2,189,016. Phillips Petroleum Company.

Process recovery one of hydrocarbons propane and propylene from gas mixtures containing the same and at least one of the hydrocarbons methane, ethane and ethylene. No. 2,189,062. I. G. Farbenindustrie Aktiengesellschaft.

Disposal process for treatment of weak ammoniacol waste liquors from coal distillation plants. No. 2,189,183. Lancaster Iron Works, Inc.

Process refining mineral oil fraction with oleum in presence of compound of urea and recovering sulfonic bodies. No. 2,189,128. Ferdinand W. Breth and Manuel Blumer.

Production of reduction products derived from dehydroandrosterone. No. 2,189,130. Schering Corp.

Process separation diolefins from gaseous hydrocarbon mixture containing mono-olefins. No. 2,189,173. The Dow Chemical Company.

Preparation crystalline sodium aluminum sulfate. No. 2,189,179. General Chemical Company.

Production easily assimilable phosphatic fertilizers from crude phosphates by decomposition in presence of steam. No. 2,189,248. Lonza Elektrizitatswerke und Chemische Fabriken Aktiengesellschaft (Gampel und Basel).

Method for purifying gas containing nitrogen oxide. No. 2,189,250. Robert Mezger and Theo Payer.

Photographic developer comprises oxidizing agent, zinc sulfate, magnesium sulfate and mono-sodium-ortho-phosphate. No. 2,189,264. Keuffel & Esser Company.

Production normally liquid gasoline-like hydrocarbons from normally gaseous hydrocarbons. No. 2,189,265. Process Management Co., Inc.

Process for fractionating nitrogen base mixtures comprises converting bases into aqueous solution of water soluble sulfites and recovering nitrogen bases by use of solubility relations. No. 2,189,278. Union Oil Company of California.

Single stage process for absorption of nitrous gases in production of nitric acid. No. 2,189,363. Mieczyslaw Joseph Kalous.

Continuous cyclic process for production of alumina from raw material. No. 2,189,376. Axel Sigurd Burman.

Method for facilitating Friedel Crafts reactions. No. 2,189,383. Armour & Company.

Cyclic process for preparation by double decomposition and separation by flotation of ammonium chloride and nitrates of alkali metals. No. 2,189,488. Jean Dessevre.

Process for fractionation resin derived from lactic acid. No. 2,189,572. Free use of the people of the U. S. of America.

Production styrene from ethyl benzol by cracking operation No. 2,189,-771. Carbide and Carbon Chemicals Corp.

Production glycerin by fermentation of sugar using yeast selected from genera consisting of top fermentation culture-press yeast. No. 2,189,793. Hugo Haehm.

Ammonia soda process. No. 2,189.826. Clifton N. Windecker and Robert E. Windecker, Painesville, O.; Robert Erwin Windecker, Irene W. Alonso, and Charles Edward Windecker, executors of said Clifton N. Windecker, deceased.

Method separating paraffinic from olefinic hydrocarbons by selectively extracting with a nitro-olefin. No. 2,190,025. Standard Oil Company.

Process removing small amounts of oxygen from a hydrocarbon fluid by use of dilute aqueous solution in presence of metallic iron. No. 2,190,043. Standard Oil Company.

Production ascorbic acid. No. 2,190,167. Merck & Co., Inc.

Process for concentration of nitric acid by means of dehydrating agent. No. 2,190,304. E. I. du Pont de Nemours & Co.

Improvement in manufacture alcohols. No. 2,190,501. Standard Alcohol Company.

Process removing oxygen from copper by use of hydrogen. No. 2,190,-570. Metallurgica Bresciana Gia' Tempini Societa Anonima.

Process refining glyceride-type oils. Nos. 2,190,588-590. Refining, Inc.

Process refining glyceride oils. No. 2,190,595. Refining, Inc.

Secondary mixed aliphatic-cyclic alcohols. No. 2,190,600. I. G. Farbenindustrie Aktiengesellschaft.

Process splitting glycerides and recovering glycerin. No. 2,190,616. Refining, Inc.

Method decomposing acid sludge from sulfuric acid purification of hydro-carbonaceous material to yield gas containing SO_2 free from H_2S. Reissue. No. 21,357. Chemical Construction Corp.

Preparation of hydrocarbon gases for polymerization. No. 2,190,662. Houdry Process Corporation.

Manufacture stable, water soluble, aromatic and heterocyclic compounds free from water solubilizing groups. No. 2,190,747. General Aniline & Film Corp.

Production sublimated Al Cl_3 by subjecting metallic aluminum to action of H Cl gas at high temp. No. 2,190,913. Ruhrchemie Aktiengesellschaft.

Method concentrating citrus fruit juices. No. 2,190,991. California Consumers Corp.

Industrial C_2H_5OH denatured with 0.5-5 parts of dimethallyl ether. No. 2,191,031. Eastman Kodak Co.

Industrial C_2H_5OH denatured with 0.5-5 parts of a dibutyl ether. No. 2,191,032. Eastman Kodak Company.

Preparation of addition products of acetylene. No. 2,191,053. Deutsche Gold und Silber Scheldeanstalt vormals Roessler.

Continuous production monovinylacetylene. No. 2,191,068. E. I. du Pont de Nemours & Co.

Production hydrocarbons by treatment of distillable carbonaceous materials with hydrogenating gases. No. 2,191,156. Standard-I. G. Company.

Process concentrating sulfuric acid. No. 2,191,195. Standard Oil Co.

Process purifying sugar solutions by treating with resin derived from catechol-tannin. No. 2,191,365. Robert Boyd.

Manufacture aqueous solutions of phenol, its homologues and derivatives. No. 2,191,405. Unichem Chemikalien Handels A.-G.

Method purifying brines containing sulfates comprises agitating with precipitated super reactive Ba CO_3. No. 2,191,411. Standard Ultramarine Company.

Metals, Alloys

Pyrometer protecting tube composed of alloy steel containing 27-35% chromium. No. 2,187,949. Claud T. Gordon Company.

Chain assembly comprising a chain having exposed surfaces covered with corrosive resistant envelope. No. 2,188,025. Link-Belt Company.

Process heat-treating chrome-ferritic steels in presence of ammonia gas. No. 2,188,137. The Chapman Valve Mfg. Co.

U. S. Chemical Patents

Low-creep metal alloy containing chromium carbon and silicon which is resistant to corrosive action of methane, propane, naphthionic acid and sulfonic acid at temperature of 1200° F. No. 2,188,138. The Chapman Valve Mfg. Co.
Process making permanent magnets comprises reducing magnetic alloy to powder, mixing with binder, and agglutinating mixture under pressure to desired form at less than 400° C. No. 2,188,091. Max Baermann, Jr.
Method annealing steel to produce non-lamellar structure therein. No. 2,188,155. Crucible Steel Company of America.
Aluminum base alloy containing up to 5% manganese and to .5% boron. No. 2,188,203. William E. Mansfield.
Process hardening ferrous articles in presence of heat consists of passing through carburizing and nitriding materials. No. 2,188,226. Adolph W. Machlet.
Magnesium alloy and certain percentage of aluminum, zinc, copper, manganese, nickel, cobalt, chromium and molybdenum. No. 2,188,239. Fritz Christen.
Method reducing or digesting an ore comprises heating in closed vessel under pressure in presence of acid fumes. No. 2,188,305. Richard K. Moreland.
Alloy formed of .01-1% osmium and balance substantially molybdenum. No. 2,188,405. P. R. Mallory & Co., Inc.
Process obtaining very pure steel at good pouring temp. No. 2,188,416. Societe d'Electrochimie d'Electrometallurgie et des Acieries Electriques d'Ugine.
Hydrometallurgical process for recovery of copper. No. 2,188,472. Chile Exporation Co.
Alloy comprising 90-98% platinum, 1.5-8% iridium and .32% nickel. No. 2,188,636. Owens-Illinois Glass Company.
Corrosion resistant copper-zinc alloy containing 58-85% copper, 0.005% to 2.0% silver, and the remainder zinc. No. 2,188,681. The American Brass Company.
Electrode consisting mainly of nickel having grain count of at least 200 in an area of 100 circular mills. No. 2,188,771. The Firestone Tire & Rubber Co.
Method making sheet, strip, rod and other articles from a mixture of powders consisting of noble metal component and minor component wherein noble metal component is at least 40% of the whole. No. 2,188,873. Handy & Harman.
Method producing metallic beryllium. No. 2,188,904. The Brush Beryllium Company.
Process for removing oxide film from surface of ferrous metal comprises bringing surface into contact with fused alloy then mechanically removing any adhering lead alloy. No. 2,188,930. E. I. du Pont de Nemours & Co.
Preparation hard metal alloys comprising reducing finely divided mixture of at least 3 refractory metal carbides and an organic salt of an additional metal selected from groups consisting of iron, nickel and cobalt. No. 2,188,983. Sirian Wire and Contact Company.
Casting alloy of constant dimensions. No. 2,189,054. Georg Von Giesche's.
Work hardened lead alloy containing $<1\%$ calcium. Said alloy is characterized by permanent hardness. No. 2,189,064. Western Electric Co., Inc.
Ferrous alloy containing 4.2% carbon, 14-18% chromium, 4-6% nickel, remainder being iron. No. 2,189,131. Arthur T. Cape and Charles V. Foerster.
Heat-hardened copper alloy containing .6-1.5% titanium .1-.6% chromium, .1-.6% silicon remainder being copper. No. 2,189,198. The Titanium Alloy Manufacturing Co.
Precipitation of copper by use of specially prepared nickel. No. 2,189,263. I. G. Farbenindustrie Aktiengesellschaft.
Reversed bimetallic thermal element comprises plurality of similarly shaped sections of metals of different states of expansion. No. 2,189,459. Norman L. Derby.
Alloy: 20-60% platinum, 10-40% palladium, 10-50% silver, 1-25% gold. No. 2,189,571. Baker & Co., Inc.
Production hard solders in form of fine metallic powders. No. 2,189,640. Johnson, Matthey & Company, Ltd.
Metal composition having non-alloying particles of tungsten bonded by alloy of lower melting point than said tungsten. No. 2,189,755. P. R. Mallory & Co., Inc.
Metal composition having non-alloying particles of molybdenum bonded by alloy of lower melting point. No. 2,189,756. P. R. Mallory & Co., Inc.
Aluminum alloy containing titanium copper, tin, zinc and magnesium. No. 2,189,834. Edward A. Schmeller, assignor ¼ Frank I. Schmeller, ¼ John L. Schmeller, ¼ John Schmeller, Sr.
Aluminum alloy for use without heat treatment consisting of ferrotitanium, copper, tin, zinc, magnesium and chromium. No. 2,189,835. Edward A. Schmeller, assignor, ¼ Frank I. Schmeller, ¼ John L. Schmeller, ¼ John Schmeller, Sr.
Method of strip annealing aluminum foil. No. 2,189,836. Crown Cork & Seal Company, Inc.
Ore crusher having axially converging and diverging crusher rings disposed in axial progression and crusher cones disposed within and co-operative with said crusher rings. No. 2,190,036. Jacob Johannes Morch.
Apparatus for eliminating pipe in casting metals. No. 2,190,209. George W. Hazy assignor of 25% to Richard C. Tuma, 6 2-3% to H. H. Handleman, 10% to Edward Gadd, and 25% to Elias C. Tuma.
Preparation alloys of calcium and aluminum comprises heating lime in molten aluminum. No. 2,190,290. Calloy Limited.
Corrosion-resisting austenitic chromium nickel steel alloy. No. 2,190,486. Krupp Nirosta Co., Inc.
Production cartridge cases of zinc-copper alloys. No. 2,190,536. Firma Kreidler's Metall & Drahtwerke Gesellschart mit beschrankter Heftung.
Manufacture of permanent magnet article of high toughness and remanence in gauss greater than 10^6. No. 2,190,667. Bell Telephone Laboratories, Inc.
Alloyed material resistant to burning and scaling in presence of O_2 at temperature $>1000°$ C. No. 2,190,781. Chemical Marketing Co., Inc.
Heat and corrosion resistant alloy of 10-30% chromium, 3-6% silicon and balance nickel. No. 2,190,840. Driver-Harris Co.
Method for reduction of oxides comprises heating ore with reducing agents. No. 2,191,377. Hans Gallusser.

Paper and Pulp

Apparatus for evaporation of so-called black liquor. No. 2,188,220. Carl Thomas Carlson.
Production sulfite acid having high concentration free So_2 comprises passing cooled sulfur burner gas through dissolving chamber countercurrent to flow of H_2O. No. 2,188,321. Paper Patents Company.
Impregnated paper for electric insulation for cables comprising paper impregnated with oil containing 5-20% hydrogenated wood rosin. No. 2,190,018. Phelps Dodge Copper Products Corp.
Process pulping chipped wood in alkaline sodium base cooking liquor. No. 2,190,193. Brown Company.
Manufacture bisulfite acid liquor. No. 2,190,612. The Dorr Company, Inc.
Process bleaching wood by treating with solution of a peroxide containing a pyrophosphate. No. 2,191,431. Buffalo Electro Chemical Co., Inc.

Petroleum

Apparatus for separation of unvaporized materials from mixture of vaporous hydrocarbons and unvaporized material. No. 2,187,741. Houdry Process Corp.
Lubricant comprising a hydrocarbon oil and a small amount of a urethane in presence of an organic nitrite. No. 2,187,742. The Atlantic Refining Co.
Method lubricating bearings consists in applying lubricant comprising mineral hydrocarbon oil having incorporated therein corrosion inhibiting proportions of tin tetra butyl. No. 2,187,802. Tide Water Associated Oil Co.
Method refining viscous hydrocarbon oils comprises treatment with H_2SO_4, neutralizing with NaOH, heating neutralized oil to 350°-550° F. in presence of NH_3 while agitating with inert fluid. No. 2,187,883. Standard Oil Co.
Process refining oils by extraction with light hydrocarbon solvent modified with liquid CO_2. No. 2,188,051. Shell Development Co.
Method treating low boiling hydrocarbon fraction and high boiling fraction to remove color-importing and gum-forming constituents, when each fraction requires different degree of treatment. No. 2,188,075. The Gray Processes Corp.
Process cracking hydrocarbon oils. No. 2,188,312. Gasoline Products Company, Inc.
Method treating hydrocarbon oils to produce lighter oils. No. 2,188,363. Texaco Development Corp.
Method converting normally gaseous hydrocarbons to normally liquid products by contact at elevated temperature with polymerization catalyst. No. 2,188,638. Process Management Co., Inc.
Process separation diolefins from hydrocarbon mixture containing monoolefins. No. 2,188,899. The Dow Chemical Co.
Extreme pressure lubricant consisting of a hydrocarbon and a small proportion of a triaryltrithiophosphite. No. 2,188,943. Socony-Vacuum Oil Co.
Method selectively producing specific olefins of the aliphatic series C_nH_{2n} from decomposing oil. No. 2,188,982. Theodore Nagel.
Process refining hydrocarbon oils comprises contacting oil with reaction product of zinc, silicate and hydrochloric acid devoid of free hydrochloric acid. No. 2,189,058. Universal Oil Products Company.
Method controlling heating of oil constituents subjected to heating operations in processing crude petroleum. No. 2,189,191. Power Patents Company.
Production furnace oil from cracking still distillates. No. 2,189,196. Standard Oil Company.
Improvement in fractionating a liquid such as petroleum. No. 2,189,491. Centrifix Corporation.
Conversion normally gaseous hydrocarbons to normally liquid hydrocarbons. No. 2,189,645. Phillips Petroleum Company.
Process treating mineral oils comprises separating wax containing lubricating oil into two fractions by solvent fractionation. No. 2,189,647. Pennsylvania Petroleum Research Corp.
Process treating paraffinic hydrocarbons to produce corresponding olefinic hydrocarbons by use of catalyst. No. 2,189,815. Universal Oil Products Co.
Process treating paraffinic hydrocarbons comprises subjection under dehydrogenating conditions to action of mixture of aluminum oxide and vanadium oxide. No. 2,189,816. Universal Oil Products Company.
Process removing mercaptans from sour petroleum distillate. No. 2,189,850. Standard Oil Development Co.
Process dewaxing oil by use of liquefied normally gaseous hydrocarbon solvent. No. 2,189,885. Standard Oil Development Co.
Process refining corrosive hydrocarbon distillates comprises treatment with higher molecular weight mercaptan in presence of sodium plumbite. No. 2,190,007. Standard Oil Company.
Method and apparatus separating oil and gas, for use in oil wells. No. 2,190,104. Clifford T. McCoy.
Method oil prospecting which includes subjecting the earth to polarizing e.m.f. and determining dependence upon time of resultant earth polarization. No. 2,190,320. Geo-Frequenta Corporation.
Process refining petroleum distillates by treating sulfuric acid-treated petroleum distillate with hydrocarbon soluble heavy metal salt of a phenolic body. No. 2,190,471. Standard Oil Development Company.
Production gasoline of designated specifications from hydrocarbon distillate containing lower boiling constituents than those desired in final gasoline. No. 2,190,480. Standard Oil Development Company.
Production normally liquid gasoline-like hydrocarbons from normally gaseous hydrocarbons by use elevated temperature and pressure. No. 2,190,624. The Polymerization Process Corp.
Method of heating a plurality of steams of hydrocarbon oil to elevated temperature. No. 2,190,635. Gasoline Products Co., Inc.
Method desulfurizing gases obtained from oil refinery operations. Reissue. No. 21,358. Process Management Co., Inc.
Method improving characteristics of lubricating oil by addition of polymerization product of propylene. No. 2,190,918. Ruhrchemie Aktiengesellschaft.
Petroleum lubricating oil having saybold viscosity 50 sec. @ 100° F., containing about .1% retene. No. 2,191,089. Sinclair Refining Co.
Petroleum lubricating oil having saybolt viscosity 50 sec. @ 100° F., containing about .1% phenyl ether. No. 2,191,190. Sinclair Refining Co.
Process treating oil. No. 2,191,091. Union Oil Company of California.
Production lower boiling hydrocarbons from crude liquid or fusible heavy or medium heavy hydrocarbon material. N. 2,191,157. Standard-I. G. Company.
Motor fuel product comprising cracked hydrocarbons. No. 2,191,204. Gasoline Antioxident Company.
Process obtaining high anti-knock and stabilized gasoline. No. 2,191,240. Gulf Oil Corp.
Method breaking petroleum emulsions of water in oil type comprising treating emulsion with cactus juice. No. 2,191,357. Kactus Company, Inc.
Process of treating petroleum oils. No. 2,191,372. Kactus Company, Inc.

U. S. Chemical Patents

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Pigments

Preparation titanium dioxide of improved color from titanium dioxide acid cake. No. 2,188,259. American Zirconium Corp.
Method stabilizing a black lacquer against flocculation. No. 2,190,461. Binney & Smith Co.

Resins, Plastics

Process condensation products, comprises condensing a nitrogenous ether. No. 2,187,823. I. G. Farbenindustrie Aktiengesellschaft.
Condensation products of butyrolactones and primary amines of the aromatic and heterocyclic series. No. 2,187,847. Winthrop Chemical Co.
Production thermoplastic heat-sensitive resin in finely divided solid form comprises atomizing solution of resin in volatile organic solvent in presence of stream of hot inert gas thereby flashing the solvent and precipitating the resin in finely divided form. No. 2,187,877. Carbide & Carbon Chemicals, Corp.
Condensation products of anthroquinone series comprises reaction of benzyl cyanide with an anthraquinone. No. 2,188,103. General Aniline Works, Inc.
Plastic composition comprising substantially homogeneous mixture containing from 65-75% calcined gypsum, 3-6% disintegrated sulfite pulp, and 2-5% diatomaceous earth. No. 2,188,199. Arthur John Phillip Care.
Process molding product obtained by saponifying vinylic ester group of mixed polymerization product. No. 2,188,272. I. G. Farbenindustrie Aktiengesellschaft.
Preparation polyvinyl acetol resin. No. 2,188,344. Eastman Kodak Co.
Process forming condensation product for use in resins, lacquers, paints, etc. No. 2,188,882. Edwin T. Clocker.
Process forming condensation products comprises reacting one of the first group consisting of maleic acid and its anhydride. No. 2,188,883. Edwin T. Clocker.
Process forming condensation product. No. 2,188,888. Edwin T. Clocker.
Colored synthetic material comprising condensation product of an acyclic olefinic acid. No. 2,188,889. Edwin T. Clocker.
Olefinic condensation product combined with a phenol and method of preparation. No. 2,188,890. Edwin T. Clocker.
Composition of matter comprising solid resinous derivative of styrene and a plasticizing agent therefore. No. 2,188,903. The Dow Chemical Co.
Production synthetic phenol cellulose resin. No. 2,189,132. The Chemical Foundation, Inc.
Production light-colored synthetic phenol-cellulose resin. No. 2,189,133. The Chemical Foundation, Inc.
Molding composition comprising cellulose derivative and plasticizer. No. 2,189,338. The Dow Chemical Company.
Method producing hard cast compositions. No. 2,189,387. Haynes Stellite Company.
Condensation products containing nitrogen and process of making same. No. 2,189,503. Society of Chemical Industry.
Production condensation product of formaldehyde with urea and phenylthiourea. No. 2,189,563. Hans Dohse and Rolf Rober.
Manufacture resin compositions of the urea aldehyde condensation type and their solutions. No. 2,189,737. Ellis-Foster Company.
Production resinous condensation product suitable for manufacture water- resisting coating compositions. No. 2,189,833. Israel Rosenblum.
Plant pot made of artificial resin and transpierced by capillary canals. No. 2,189,889. Walter Engel.
Production synthetic resin comprises subjecting wood tar to distillation under vacuum and reacting distillate with formaldehyde, aniline and potassium carbonate. No. 2,190,033. Jean J. Levesque.
Production artificial resins by condensing an aliphatic aldehyde from group consisting of acetaldehyde, aldol and crotonaldehyde. No. 2,190,184. I. G. Farbenindustrie Aktiengesellschaft.
In process for cold molding plastic material, method of preparing materials. No. 2,190,605. Plastic Molding Corp.
Water soluble phenol-aldehyde resins. No. 2,190,672. Bakelite Corp.
Resinous reaction product of formaldehyde with a carbozylic acid amide. No. 2,190,829. E. I. du Pont de Nemours & Co.
Process treating crude olefin-sulfur dioxide resin. No. 2,190,836. E. I. du Pont de Nemours & Co.
Copolymer of styrene and tung oil. No. 2,190,906. The Dow Chemical Co.
Copolymers of styrene with oiticica oil or its derivatives. No. 2,190,915. The Dow Chemical Co.
Manufacturing materials from insoluble polyvinyl chloride and softening agent. No. 2,191,056. I. G. Farbenindustrie Aktiengesellschaft.
Continuous production polymerization products of acetylene. No. 2,191,-088. E. I. du Pont de Nemours & Co.
Condensation products of perylene series. No. 2,191,114. General Aniline & Film Corp.
Method separation chemically modified rosins and their esters into components. Nos. 2,191,306-311. Hercules Powder Co. & Joseph J. Borglin.

Rubber

Process comprising vulcanizing a vulcanizable rubber mix in presence of ethyl carboxy methyl di (diethyl dithiocarbonate). No. 2,188,280. Wingfoot Corporation.
Method forming rubber product comprises interposing between artificial silk and rubber, a casein adhesive and a vulcanizable rubber material, and then subjecting the whole to vulcanization. No. 2,188,283. Wingfoot Corporation.
Laminated gasket composed of rubber sandwiched between rubber hydrochloride sheets. No. 2,188,286. Wingfoot Corp.
Preparation resilient, rubberlike, molded polyvinyl halide products. No. 2,188,396. The B. F. Goodrich Company.
Process comprises vulcanization of rubber in presence of organic accelerator and quaternary ammonium salt of aliphatic monocarboxylic acid. No. 2,188,420. B. F. Goodrich Company.
Device for heating of flowing liquids such as rubber latex, employs metallic electrodes. No. 2,188,625. Rene Alphonse Dufour, & Henri Auguste Leduc.
Method compounding an ammonia-preserved natural rubber latex. No. 2,188,736. United States Rubber Co.
Rubber transfer comprising a carrier, a layer of water soluble material upon said carrier, and a thin elastic film of rubber overlying said layer of water soluble material. No. 2,188,866. Meyercord Company.
Process for making rubber accelerator compositions. No. 2,188,980. United States Rubber Company.
Process accelerating vulcanization of rubber by use of 2-mercapto quinoline. No. 2,189,717. Wingfoot Corporation.
Process accelerating vulcanization of rubber by use of thiuronium 2-arylenethiazyl sulfide. No. 2,189,720. Wingfoot Corporation.
Process improving age resisting qualities of rubber by incorporation of reaction product of primary amine and phenolic bodies. No. 2,189,-725. Wingfoot Corp.
Method preserving rubber comprises curing in presence of anti-oxidant. No. 2,189,736. Wingfoot Corp.
Apparatus for continuous vulcanization of rubber. No. 2,190,266. Roth Rubber Company.
Package consisting of rubber hydrochloride of 27-35% chlorine content immersed in water and a container therefore. No. 2,190,287. E. I. du Pont de Nemours & Co.
Method decreasing resistance to flow of unvulcanized rubber by use of thiazole compound. No. 2,190,587. E. I. du Pont de Nemours & Co.
Method decreasing resistance to flow of unvulcanized rubber comprises subjection to action of monothiocarboxylic acid. No. 2,191,266. E. I. du Pont de Nemours & Co.

Textiles

Production substance for water-proofing textile materials. No. 2,187,858. Chemische Fabrik R. Baumheier Kommditgesellschaft.
Process coloration artificial ribbons, films and other materials having a basis of organic derivatives of cellulose and containing a plasticizer therefor. No. 2,188,160. Celanese Corp.
Aqueous composition for use in sizing yarns containing organic derivatives of cellulose. No. 2,188,167. Celanese Corp.
Weft-wise elastically stretchable woolen fabric. No. 2,188,183. William L. Morris.
Method making waterproof, light resistant, flexible fabric comprising impregnating and coating fabric with a lacquer. No. 2,188,901. Columbus Coated Fabrics Corporation.
Production local colored effects on fabrics of cellulose acetate. No. 2,189,017. Henry Dreyfus.
Production nitrogen containing condensation products useful in textile and related industries. No. 2,189,648. I. G. Farbenindustrie Aktiengesellschaft.
Apparatus for applying liquid to web or sheet material. No. 2,189,914. Celanese Corp.
Method drying layers or sheets of material. No. 2.189,915. Celanese Corp.
Process conditioning yarn to render it more amenable to textile operations. No. 2,190,865. Eastman Kodak Co.
Textile lubricating composition adapted for treatment synthetic warp yarns. No. 2,191,033. Eastman Kodak Co.
Process conditioning yarn to render it more amenable to textile operations. No. 2,191,039. Eastman Kodak Co.
Apparatus for continuous production curled rayon staple fibres. No. 2,191,296. I. G. Farbenindustrie Aktiengesellschaft.
Treatment textile materials with hardenable condensation products obtained from aldehydes and aminotrazines as essential reactaint. No. 2,191,-362. Ciba Products Corp.

Abstracts of Foreign Patents

By E. L. Luaces, Chemical Consultant

To assist those making use of this summary, it might be well to comment briefly on the system used by each of these countries in reporting patents.

Canada grants the patent on the date of publication. It does not print the patents, but supplies typewritten certified copies at a cost averaging about five dollars each.

English "patents" here reported are known as *Complete Specifications Accepted* and are open to opposition by interested parties for a period of two months from date of publication. Printed copies may be obtained at ls. ld. each.

French patents are granted several months before publication, and the printed report issued several days or even weeks after its date. Printed copies may be obtained at 10 francs each.

Belgian patents, like French, are granted long before publication. The report comes out 12 times each year, and photostatic copies can be obtained at from 3.50 to 4.50 francs per page.

In this digest the latest available data will be published, but it will be understood that some delay will occur as a result of present conditions in Europe. The German patents will be reported just as soon as we are sure of uninterrupted service.

We shall be glad to receive comments or criticisms.

BELGIAN PATENTS GRANTED MAY 31, 1939 PUBLISHED NOVEMBER 11, 1939 (Class F et seq.)

Impermeation of textiles by reaction on their surface of soluble or insoluble salts of fatty acids with metallic oxide or hydroxide. No. 433,651. Société Rhodiaseta.

Manufacture of filaments, films, etc., from keratin substances. No. 433,683. J. van den Bergh, G. J. Milo and H. E. P. van Dijck.

Treatment of textile fibres with an aqueous solution of a copper salt, followed by one containing ammonia and an alkali hydroxide; then washing. No. 433,99. Ridgway, Whitnig & Bodenschatz, Inc.

Preparation of cellulose solutions for rayon production by soaking cellulose in aqueous solution of a copper salt, then treating it with a solution of ammonia and an alkali hydroxide, at low temperature. No. 433,700. Ridway, Whiting & Bodenschatz, Inc.

Preparation of polyamides of high molecular weight which may be transformed into fibres. No. 433,932. E. I. du Pont de Nemours & Co., Inc.

Manufacture of artificial fibres from a solution resulting from treating soya casein mixed with milk casein with sodium or potassium hydrate and sodium hydrosulfite. No. 433,999. A. Ferretti.

Redyeing of cellulose fibres by treatment with alkaline earth hydroxides. No. 434,058. A. Furth.

Bleaching of cellulose fibres by treatment with warm solution containing calcium hydroxide, then through a bleaching bath containing peroxides, and finally through a soda bath to transform the calcium soaps and fatty acids to soluble soaps. No. 434,059. A. Furth.

Preparation of granulated pure caustic soda for use as gas absorbent. No. 433,707. Auergesellschaft A. G.

Preparation of absorbent for carbonic gas in shelters or masks, by adding sodium bicarbonate to caustic soda infusion, and crushing after the mass has cooled. No. 433,779. Auergesellschaft A. G.

Preparation of absorbents for carbonic gas by adding alkaline carbonates or oxides to alkali hyroxides infusion, and after cooling, crushing to size. No. 433,780. Auergesellschaft A. G.

BELGIAN PATENTS GRANTED JUNE 30, 1939 PUBLISHED DECEMBER 22, 1939 (Classes A-E incl.)

Preparation of coffee concentrate by freezing excess water in a coffee infusion and separating the liquid centrifugally. No. 434,501. L. Basset.

Manufacture of low-phosphorus Thomas steel. No. 434,115. S. A. des Forges & Acieries du Nord et de l'Est.

Method of producing gas for use as atmosphere in heat treatment of metals, by drying combustion gases with a solid which is regenerated by the heat in the air heated by the gas during its cooling. No. 434,137. Shell Marketing Company, Ltd.

A mixture of manganese salts and alkali metal or alkaline earth metal salts, barium peroxide, black nickel oxide and cobalt oxide is used as combustion activator for mineral combustibles. No. 434,168. J. Delattre.

Process of manufacturing and refining steel. No. 434,169. H. A. Brassert & Co.

Articles of clad metal in which the cladding contains 12-35% Cr, less than 0.35% C, 1-5% Mo, less than 0.5% nitrogen, and a quantity of Niobium more than four times the carbon content while the steel backing does not contain more than 10% of metals other than iron. No. 434.170. Electro Metallurgical Company.

Austenitic alloys suitable for lining pistons and cylinders, containing 2.5-3.5% C, 2-5% Si, 4-12% Mn, 1.5-8% Ni and about 10% Co. No. 434,238. Robert Zapp, S.A.

Improving the resistance to surface oxidation of iron-chrome-nickel alloys by additions of titanium and zirconium not exceeding 1%. No. 434,341. Ruhrstahl A.G.

Improving the resistance to surface oxidation of iron-chrome-aluminum alloys by addition of titanium or titanium alloys not in excess of 1%. No. 434,342. Ruhrstahl A.G.

Improving the resistance to surface oxidation of iron-chrome-nickel alloys by addition of zirconium not in excess of 1%. No. 434,343. Ruhrstahl A.G.

Recovery of tin from materials containing it by treatment in vertical furnaces wherein the tin volatilized as tin sulfide. No. 434,350. Aktiebolaget Industrimetoder

Preparation of magnesium alloys by adding to magnesium necessary quantities of an alloy consisting of 30-44% Al, 24.5-41% Zn, 2-4% Mn, 3.5-8% Ni and 17-26% Mg. No. 434,355. F. Christen.

Electrostatic separator for ores and other materials. No. 434,424. Metallgesellschaft A.G.

Steel containing 5-7% Mo, 4-8% W, 0.5-1% C, 3-5% Cr, and 0.5-3% V. No. 434,635. Climax Molybdenum Company.

Powdered refractory cement and refractory products therefrom. No. 434,107. I.G. Farbenindustrie A.G.

Process and apparatus for the production of glass fibres. No. 434,529. Algemeene Kunstvezel Mij. N.V.

Preparation of glycolic acid by reacting formic aldehyde carbon monoxide and an organic or mineral acid in the absence of water. No. 433,-721. E. I. du Pont de Nemours & Co., Inc.

Moulding of poylmerized ethylene under pressure and at a temperature not lower than the melting point of the polymer. No. 433,748. Imperial Chemical Industries, Ltd.

Manufacture of hydroxyaldehydes and hydroketones. No. 4338100. Imperial Chemical Industries, Ltd.

Adhesive suitable for manufacturing corrugated paper, containing 10-50 parts of gelatinized starch and 90-50 parts of non-gelatinized starch. No. 433,835. Corn Products Refining Company.

Preparation of stable dispersions of bitumens and mixtures of cement and bitumens. No. 434,035. N.V. de Bataafsche Petroleum Mij.

Moulding compositions and moulded products derived from substituted acrylic acid. No. 434,047. Imperial Chemical Industries, Ltd.

Substances of capillary activity obtained by reacting sulfurous anhydride, a halogen and saturated aliphatic hydrocarbons having less than 7 carbon atoms in the molecule, until half the hydrocarbons have been transformed into substances containing oxygen, sulfur and halogen; then saponifying the product. No. 434,141. I. G. Farbenindustrie A.G.

Preparation of derivatives of furane of the pyrazolone series. No. 434,144 Schering A.G.

Purification of nitriles by contacting with a solution containing sulfurous acid or one of its water soluble salts. No. 434,155. E. I. du Pont de Nemours & Co., Inc.

Improving the corrosion resistance of metals by treatment with a phosphate solution containing a nitrate accelerator. No. 434,156. Société Continental Parker.

Preparation of new amidines by reacting amino acids or their derivatives with amines. No. 434,164. Société pour l'Industrie Chimique à Bale.

Preparation of amido acids amidines by reacting the ethereal salts of oxyalkylamidines with amines. No. 434,165. Société pour l'Industrie Chimique à Bale.

Electrolytic decomposition of alkali or alkaline earth compounds. No. 434,184. I. G. Farbenindustrie A.G.

Manufacture of active carbon pellets by drying them at 80-130°C., covering their surfaces with powdered wood charcoal either before or during drying, and then activating. No. 434,189. Deutsche Gold und Silber Scheidenstalt vormals Roessler.

Preparation of mono-azo dyes. No. 434,195. I. G. Farbenindustrie A.G.

Production of anhydrous sodium hyposulfite. No. 434,226. I. G. Farbenindustrie A.G.

Hydration of olefines. No. 434,228. Les Usines de Melle.

Soap containing fine silica gel. No. 434,326. A. Moreau.

CANADIAN PATENTS GRANTED JANUARY 23, 1940

Buoyant soap cake made by compressing and sealing ends of a hollow soap bar. No. 386,422. Ruel Anderson Jones.

Wood pulp production and method of handling digester waste liquor. No. 3286,427. Albert Elias Nielson.

Alkali metal and hydroxide production by heating together and reacting sodium chloride, lime and coke by high frequency induction with exclusion of air, and withdrawing vapors containing sodium. No. 386,436. Thomas Woods.

Resinous product comprising the reaction product of an unsubstituted polyhydric alcohol with a resinous condensation product of a phenolcarboxylic acid and a methylene containing agent. No. 386,445. Bakelite Corporation.

Method of making phenol-oil resinous composition by heating a phenol at least to 170°C. with an unsaturated fatty acid and zinc oxide. No. 386,446. Bakelite Corporation.

Foreign Chemical Patents

Belgian, Canadian, French & English—p. 8

Improvement in the removal of sulfur, oxides, slag and gases from molten iron produced in coke-fired blast furnaces. No. 386,453. H. A. Brassert & Co.

Treatment of textile materials of natural or regenerated cellulose by impregnating with formaldehyde in the presence of free isocyclic sulfonic acid, drying, washing, and again drying. No. 386,454. The Calico Printers' Assn., Ltd.

Use of hormone-like substances for stimulating fruit growth. No. 386,474. The Dow Chemical Company.

Treatment of porous earth or rock formations by introducing a resin-forming liquid capable of transforming into solid resin. No. 386,475. Dow Chemical Co.

Method of producing a coating on articles of magnesium or its alloys by first subjecting them to the action of an aqueous solution containing chromic sulfate and an alkali metal chromate. No. 386,476. Dow Chemical Company.

Improvements in the process of concentrating nitric acid by means of a dehydrating agent. No. 386,477. E. I. du Pont de Nemours & Co., Inc.

Manufacture of lead arsenate from lead oxygen compound and arsenic acid in two-phase reaction. No. 386,481. General Chemical Company.

Terpene ether derived from an unsaturated terpene compound by the addition of a monohydric alcohol containing not less than three carbon atoms to a double bond of the unsaturated terpene compound. No. 386,487. Hercules Powder Company.

Recovery of vanadium from phosphoric acid containing the same. No. 386,492. A. R. Maas Chemical Company.

Preserving of rubber by treating it with an aryloxy substituted diary amine. No. 386,493. Monsanto Chemical Company.

Adhesive compositions consisting mainly of rubber, glycerine, casein and water. No. 386,495. National Adhesives Corporation.

Glass wool containing a thin coating of free alkali over the individual fibres. No. 386,501. Owens-Corning Fiberglass Corporation.

Soda soap grease containing a viscous mineral oil, a soda soap and a minor proportion of an organic carboxylic acid containing an aromatic ring. No. 386,507. Shell Development Corporation.

Extraction of naphthenic acid from hydrocarbon-type oils containing same. No. 386,508. Shell Development Corporation.

Perspiration-resistant lacquer consisting of approximately: nitrocellulose 52 parts, alkyd resin 18 parts, dibutyl phthalate 15 parts, impalpable silica gel 15 parts and suitable volatile solvent. No. 386,518. Western Electric Co., Inc.

CANADIAN PATENTS GRANTED JANUARY 30, 1940

Production of alkylated aromatic hydrocarbons by condensing an unsaturated aliphatic hydrocarbon containing from 3 to 5 carbon atoms with an aromatic hydrocarbon using concentrated sulfuric acid. No. 386,531. H. M. Stanley and J. E. Youell.

Quick-aging of alcoholic beverages by direct action of mechanically produced compressional waves of super-sonic frequency in excess of 50,000 cycles per second. No. 386,532. Roy Wilkins and Jakob A. Bachmann.

Production of cellulose from lignin-containing cellulosic materials by treatment with nitrous acid, an organic acid, and an alkali solution. No. 386,537. Henry Dreyfus.

Anti-freeze composition with freezing point of —50°F., boiling point of 225°F., and sp. gr. of 1.26. No. 386,547. B. W. Jarboe.

Production of fusible, soluble phenolic resins by resinification of phenol-aldehyde condensate in presence of a terpene compound and sulfuric acid No. 386,556. Israel Rosenblum.

Production of hydrogen peroxide from acid electrolyte solutions containing the persulfate radical. No. 386,572. Buffalo Electro-Chemical Co., Inc.

Production of hydrogen peroxide from bisulfate-sulfuric acid solutions. No. 386,573. Buffalo Electro-Chemical Co., Inc.

Manufacture of graphitized carbon black from dry flocculent carbon black by agglomeration and heating at about 2000°C. No. 386,574. Godfrey L. Cabot, Inc.

Polivivyl acetal resin in which the acetal linkages are formed from compounds including aliphatic aldehydes with more than 4 carbon atoms, aromatic aldehydes, and cyclic ketones. No. 386,580. Canadian Kodak Company, Ltd.

2,2'-Diethyl-8-methyloxaselenacarbocyanine iodide. No. 386,581. Canadian Kodak Company, Ltd.

4-[2-Ethyl-1(2)-benzoselenazolylidene) ethylidene]-2-phenyl-5-oxazolone. No. 386,582. Canadian Kodak Company, Ltd.

2-Hydroxymethyl-1,3-dioxolane. No. 386,589. Carbide and Carbon Chemicals, Ltd.

2-p-Dioxanone. No. 386,590. Carbide and Carbon Chemicals, Ltd.

Preparation of hydroxy propanone by dehydrogenating 1,2 propylene glycol. No. 386,591. Carbide and Carbon Chemicals, Ltd.

Flexible abrasive sheet in which the sandsize coating comprises a urea-formaldehyde-alcohol resin and a blending or softening agent. No. 386,601. E. I. du Pont de Nemours & Co., Inc.

Production of nitrous oxide by heating ammonium nitrate with a catalyst containing phosphorus. No. 386,602 (see also No. 386,603). E. I. du Pont de Nemours & Co., Inc.

Manufacture of white lead pigment. No. 386,608. Hughes-Mitchell Processes, Inc.

Preparation of alcoholic dispersions of titanium pigments. No. 386,622. National Lead Company.

Preparation of titanium oxide pigments. No. 386,623. National Lead Company.

Method of hydrolyzing titanium salt solutions. No. 386,624. National Lead Company.

Preparation of pure titanium dioxide having crystalline structure. No. 386,625. National Lead Company.

Agent for removing iron, manganese and hydrogen sulfide from water, comprising granules of mixed pumice, cement and powdered pyrolusite. No. 386,633. Research Products Corporation.

Removal of acid components from hydrocarbon distillates. No. 386,634. Shell Development Corporation.

Preparation of thyroxin. No. 386,645. Winthrop Chemical, Co., Inc.

Preparation of para-phenanthrolin and its derivatives. No. 386,646. Winthrop Chemical Company, Inc.

Preparation of arsenobenzene-mono-sulfoxylate. No. 386,659. Winthrop Chemical Company, Inc.

CANADIAN PATENTS GRANTED FEBRUARY 6, 1940

Combination welding flux and welding rod comprising a metal core coated with a thermoplastic resin which will burn slowly without objectionable odor or depositing char. No. 386,702. Dominion Oxygen Co., Ltd.

Preparation of boron fluoride by reacting a complex of water and boron fluoride with calcium fluoride, evaporating the water, and driving off the boron fluoride. No. 386,704. E. I. du Pont de Nemours & Co., Inc.

Method of distilling fatty acids. No. 386,706. Foster Wheeler Corporation.

Method for dewaxing divellicated paper stock. No. 386,719. The Institute of Paper Chemistry.

Clarification of industrial acid liquors containing a strong inorganic acid. No. 386,729. National Lead Company.

Conversion of copper sulfide into copper hydroxide by suspending it in a dilute alkaline solution, agitating it with air. No. 386,730. New Process Rayon, Inc.

Deacidification of water by contacting with an insoluble keratin substance displayed on inert bodies and regenerated by a basic wash. No. 386,731. The Permutit Company.

Composition for cementing oil wells comprising cement, water, and a finely divided insoluble weighing material capable of raising the specific gravity of the cement-water mixture. No. 386,743. Shell Development Corporation.

Sealing of porous formations by introducing a solution capable of liberating fluosilicic ions, and reacting it within said formations with a water-soluble alkali salt to precipitate water-insoluble alkali fluosilicate in the pores. No. 386,744. Shell Development Corporation.

Cleaning oil wells from high-melting organic deposits by introducing an inorganic oxidizing compound, a comminuted electropositive metal and an aqueous solution of an acid; using the heat of reaction to melt deposits. No. 386,745. Shell Development Corporation.

Recovery of gonadotropic hormones from serum of pregnant mares. No. 386,750. Société de l'Institut de Sérothérapie Hémopoiétique S.A.

Anti-corrosion protection of heating equipment by electrolysis. No. 386,772. Julia A. MacDougall and Leonard V. Sutton.

CANADIAN PATENTS GRANTED FEBRUARY 13, 1940

Process of gelatinizing cellulose nitric esters with liquid nitric esters by gelatinizing in the presence of an accelerator comprising ethylene glycol diethyl ether. No. 386,781. John T. Power and Kenneth R. Brown.

Purification of seaweed, method of fireproofing, and production of articles therefrom. No. 386,792. John Stuart Campbell.

Production of pelleted superphosphate fertilizer. No. 386,798. L. H. Facer.

Composition for paint, coating and moulding. No. 386,804. Mone R. Isaacs.

Processing of carbon black to form granules. No. 386,813. Howard W. Price.

Process of dispersing pigments. No. 386,834. Canadian Industries Limited.

Beaten or aerated uncooked food compound containing a syrup in which dextrose is insoluble, ground dextrose hydrate, and an edible colloid. No. 386,846. Corn Products Refining Company.

Chocolate coating compound comprising an intimate mixture of fat-containing chocolate, dextrose, gelatine and gelatinized thin boiling starch. No. 386,847. Corn Products Refining Company.

Manufacture of resins by condensation of a phenol-acetaldehyde mixture in the presence of an acid catalyst and then heating to at least 180°C. in the presence of oxalic acid. No. 386,851. Ellis-Foster Company.

Method of roasting coarse metal sulfide ores. No. 386,857. General Chemical Co.

Process for coloring wet-out leather. No. 386,860. Imperial Chemical Industries, Ltd.

Manufacture of vanillin from ligno-products. No. 386,867. Marathon Paper Mills Company.

Insecticides and fungicides. Nos. 386,880 to 386,883 incl. Spray Base Corp.

Process of producing a substituted highmolecular phenolic compound. No. 386,912. Reichhold Chemicals.

CANADIAN PATENTS GRANTED FEBRUARY 20, 1940

Fireproofing wood by impregnating with ammonium chloride and acetic acid, at 190-200°F., and then drying it. No. 386,914. D. F. Moore and M. A. Wicks.

Method of dispelling fog by burning fuel, charging the products of incomplete combustion with hydroscopic substances and discharging said charged products over a fog blanketed area. No. 386,932. Clellan Ross Pleasants.

Moulded, vulcanized, colored hard rubber compound containing arsenic sulfide. No. 386,947. American Hard Rubber Company.

Bearing metal alloys containing antimony, tin, copper, tellurium and lead in various proportions. No. 386,973. The Cleveland Graphite Bronze Company.

Preparation of silica for use in glass batches by acid treatment and flotation to remove iron impurities. No. 386,974. Corning Glass Works.

Coating composition comprising a colloidal dispersion of a wax in an oleo-resinous base. No. 386,975. E. I. du Pont de Nemours & Co., Inc.

Preparation of dry chrome-tanned leather having wetting back properties. No. 386,978. Imperial Chemical Industries, Ltd.

Production of nickel strips of uniform gauge and shape directly from cathodes by heating to 1900-2000°F., hot rolling and then cold rolling. No. 386,979. The International Nickel Company, Inc.

Preparation of pure titanium dioxide having rutile crystalline structure by hydrolytically precipitating non-peptized, easily filterable hydrous titanium tetrachloride solution containing a small amount of negative divalents coagulating ion, separating and calcining to rutile crystalline form. No. 386,985. National Lead Company.

Improvement in removing tin from lead alloys with molten caustic soda. No. 386,986. National Lead Company.

Method of metallizing the surface of a ceramic body. No. 386,989. The Ohio Brass Company.

Production of halogenated epoxide. No. 387,002. Shell Development Corp.

Treatment of iron alloys containing carbon by incorporating tantalum, niobium, vanadium, zirconium, boron or titanium in quantity sufficient to convert the major portion of the carbon to carbide. No. 387,005. Sofal Limited.

Germicidal composition for telephones comprising chloramine-T, petroleum jelly and liquid paraffine, approximately in the proportions of 200, 100 and 45 parts by weight respectively. No. 387,011. Telegene Proprietary Limited.

Method for applying nitrocellulose coatings. No. 387,022. John M. Wallace.
Vinyl resin composition. No. 387,024. Carbide and Carbon Chemicals, Ltd.
Improved synthetic resin of the polybasic acid-polyhydric alcohol-modifying acid series. No. 387,025. The Glidden Company.

ENGLISH COMPLETE SPECIFICATIONS ACCEPTED. PUBLISHED JANUARY 10, 1940, AND SUBJECT TO OPPOSITION FOR TWO MONTHS FROM THAT DATE

Protein material and method of making it. No. 516,340. Soysein Process Corp.
Treatment of carbonaceous materials for the production of water gas or producer gas. No. 516,281. A. R. Griggs.
Degreasing metal and metal parts. No. 516,218. Bennett (Hyde), Ltd.
Method of and apparatus for producing dispersions. No. 516,341. H. Hardie.
Yeast preparation. No. 516,343. C. Weizmann.
Manufacture of artificial resins. No. 516,344. Albert Products, Ltd.
Apparatus for distributing sewage over a filter bed. No. 516,345. Mills & Co. (Engineers), Ltd.
Copper-aluminum alloy. No. 516,347. H. C. Hall and H. E. Gresham.
Hard alloys. No. 561,227. British Thomson-Houston Co., Ltd.
Air purifying apparatus No. 516,350. F. W. Wildish and W. J. Findlay.
Preparation of hydrocarbons from carbon monoxide and hydrogen. No. 516,352. I. G. Farbenindustrie A.G.
Catalytic conversion of alcohols to olefines. No. 516,235. Distillers Co., Ltd.
Dyestuff mixtures and application thereof. No. 516,240. Society of Chemical Industry in Basle.
Production of fabrics coated with rubber or other like resin, natural or artificial. No. 516,365. Veedip, Ltd.
Froth flotation concentration apparatus. No. 516,181. Minerals Separation, Ltd.
Lubricants and their manufacture. No. 516,182. E. I. du Pont de Nemours & Co.
Method of making flexible layered materials. No. 516,368. Dynamit-Akt.-Ges. vorm. A. Nobel & Co.
Manufacture of titanium pigments. No. 516,369. British Titan Products Co., Ltd.
Manufacture of heterocyclic compounds. No. 516,288. May & Baker, Ltd.
Lubricants and their manufacture. No. 516,374. E. I. du Pont de Nemours & Co.
Obtainment of magnesium from oxidic magnesium compounds by reduction with carbon. No. 516,381. Magnesium Metal Corporation, Ltd.
Therapeutically valuable diguanidine compounds. No. 516,289. May & Baker, Ltd.
Manufacture of vat dyestuffs. No. 516,391. I. G. Farbenindustrie A.G.
Production of tufts or like members composed of textile yarn, strip material or filament No. 516,398. Shephard, Spray & Haddon, Ltd.
Preparation of beta-chloro-propionic acid. No. 851,224. Rohm & Haas G.m.b.H.
Process for maturing alkali cellulose. No. 851,253. Rheinische Kunstseide A.G.
Vat dyes. No. 851,019. Société pour l'Industrie Chimique à Bale.
Preparation of azo dyes. No. 851,119. Société pour l'Industrie Chimique à Bale.
Production of poly-azo dyes. No. 851,255. I. G. Farbenindustrie A.G.
Continuous reaction process of saturated tertiary hydrocarbons and olefines. No. 851,031. Standard Oil Development Company.
Mineral oil extraction and paraffine removal process. No. 851,140. Edeleanu G.m.b.H.
Treatment of waxy mineral oil products. No. 851,262. Edeleanu G.m.b.H.
Improved method and apparatus for refining oil. No. 851,271. C. W. Woodworth.
Improvement in manufacture of regenerated rubber. No. 850,981. The B. F. Goodrich Company.
Improvement in vulcanization. No. 850,982. The B. F. Goodrich Company.
Production of synthetic resins. No. 851,015. I. Rosenblum.
Improvement in the treatment of rubber. No. 851,030. Consolidated Rubber Manufacturing, Ltd.
Improvement in the stability of objects moulded from rubber or other artificial analogous substances. No. 851,122. I. G. Farbenindustrie A.G.
Process for saccharification of cellulose to obtain solutions of sugar suitable for producing industrial alcohol. No. 851,147. M. Giordani and P. Leone.
Process for desulfurizing gas. No. 851,179. I. G. Farbenindustrie A. G.
Adhesive compositions and products therein. No. 851,083. Stein, Hall Mfg. Co.
Process for preventing or destroying the polarization of catalysts. No. 850,939. Mino Business Trust.
Treatment of hydrocarbons used as binders in bitumastic linings. No. 850,940. A. O. Hubert and C. Thuret.
Improvements in synthetic products. No. 850,946. H. Dreyfus.
Condensation product containing nitrogen. No. 851,018. Société pour l'Industrie Chimique à Bale.
Anti-polymerization product, its manufacture and uses. No. 851,036 Cie. des Meules Norton (S.A.).
New product resembling asbestos. No. 851,169. W. Ludke.
Method of regenerating catalysts. No. 851,190. Standard Oil Development Co.
Improvements in the manufacture of artificial filaments, films, etc. No. 851,221. H. Dreyfus.
Process and apparatus for producing acetylene. No. 851,235. I. G. Farbenindustrie A.G.

FRENCH PATENTS GRANTED OCTOBER 2, 1939 PUBLISHED OCTOBER 19, 1939

Manufacture of dried albumin. No. 851,495. Metallgesellschaft A.G.
Insecticides. No. 851,479. Imperial Chemical Industries, Ltd.
Waterproofing of textiles of vegetable origin. No. 851,350. I. G Farbenindustrie A.G.
Process of dyeing mixed wool and regenerated cellulose fibres and dye stuff used. No. 851,359. I. G. Farbenindustrie A.G.
Treatment of cyanide solutions. No. 851,454. The Merrill Company.
Treatment of iron ores containing titanium. No. 851,607. Christina Spigerverk.
Production of glass articles of high mechanical strength. No. 851,329 Corning Glass Works.
Preparation of secondary amino alcohols hydroxylated in their nucleus and of corresponding amines. No. 851,296. R. Sachs.
Production of oily hydrocarbons from carboniferous substances which are solid, semi-solid, or difficult to volatilize. No. 851,335. N. V. Internationale Hydrogeneerings Octrooien Mij.
Improvements in producing the ethereal salts of 2-keto-levo gluconic acid. No. 851,347. A. Corbellini.
2-Hydroxynaphthalene-4-sulfonic acid, its substitution products, and preparation of these products. No. 851,349. I. G. Farbenindustrie A.G.
Cold preparation of sodium carbonate crystals. No. 851,539. S Tapiero.
Recovery of bromides from brines. No. 851,613. Palestine Potash, Ltd.
Vat dyes of the anthraquinone series and process for their manufacture No. 851,445. I. G. Farbenindustrie A.G.
Fast dyes and process of manufacture. No. 851,482. I. G. Farbenindustrie A.G.
Production of substances suitable for lacquers, paints, and adhesives. No. 851,523. I. G. Farbenindustrie A.G.
Production of azo dyes. No. 851,524. I. G. Farbenindustrie A.G.
Transformation of lower hydrocarbons into those of straight or branch chain types. No. 851,336. I. G. Farbenindustrie A.G.
Transformation of fatty bodies into hydrocarbons. No. 851,367. M. M. J. Bouffort.
Treatment of hydrocarbons or other fluids in the presence of catalysers regenerated *in situ*. No. 851,576. Cie. Français des Procédés Houdry.
Polymerization of di-olefines. No. 851,303. Les Usines de Melle.
Separation of suspended, emulsified or colloidal matter from water No. 851,549. N. V. W. A. Scholten's Chemische Fabrieken.
Purification of gas containing acetylene. No. 851,620. I G. Farbenindustrie A.G.
Preparation of catalyst. No. 851,354. Standard Oil Development Company.
Manufacture of condensation products containing sulfur. No. 851,451. Silesia Verein Chemischer Fabriken.
Improved plastic products from vinyl resins. No. 851,561. Carbide and Carbon Chemicals Corporation.
Dispersions and emulsions and methods of preparation. No. 851,565. I. G. Farbenindustrie A.G.
Manufacture of water gas using an electric arc. No. 851,502. M. R Balseda.

FRENCH PATENTS GRANTED OCTOBER 9, 1939 PUBLISHED OCTOBER 26, 1939

Manufacture of superphosphate and compounded fertilizers. No. 851,785. Entreprise René & Jean Moritz (S.R.L.)
Anti-parasitic product and process of manufacture. No. 851,697. Hercules Powder Company.
Refining of dextrose solutions from starch saccharification. No. 851,776. Corn Products Refining Company.
Manufacture of casein fibres. No. 851,753. I. G. Farbenindustrie A.G.
Washing and desulfurizing of freshly coagulated rayon. No. 851,768. Algemeene Kunstzijde Unie N.V.
Process and apparatus for recovering fibres from rubberized materials containing them. No. 851,857. Deutsche Asbestwerke Georgi Reinhold & Cie.
Process for waterproofing vegetable fibres. No. 851,904. I. G. Farbenindustrie A.G.
Treatment of ores, slags and analogous substances containing metallic oxides hard to volatilize, and products thus obtained. No. 851,795. I. G. Farbenindustrie A.G.
Improvements in hardened lead alloys particularly useful in manufacturing bearings. No. 851,686. National Lead Company.
Gold-copper alloys having the color of gold and articles made therewith. No. 851,780. Deutsche Gold und Silber Scheideanstalt vormals Roessler.
Manufacture of steel from cast iron. No. 851,815. August Thyssen Hutte A.G.
Steel alloys highly resistant to heat. No. 50,182/822,527.* Kohle und Eisenforschung G.m.b.H.
Method of producing an anti-corrosion film on the surface of metals and alloys. No 851,861. Cie. de Produits Chimiques et Electrometallurgiques Alais, Froges et Camarque.
Formation of anti-corrosion films on the surface of magnesium or its alloys. No. 851,880. Langbein-Pfanhauser-Werke A.G.
Phosphate products for protecting iron surfaces from rust. No. 50,154/836,140.* Produits Chimiques T.B.I. (S.R.L.).
Improvements in the preparation of cellulose esters. No. 851,637. R. Charbin.
Manufacture of aqueous solutions of hypochlorous acid. No. 851,659. Potasse et Produits Chimiques (S.A.).
Treatment of phosphate mud. No. 851,794. I. G. Farbenindustrie A.G.
Production of valuable products, such as ketenes and olefines. No. 851,816. N. V. de Bataafsche Petroleum Mij.
Preparation of a condensation product having the constitution of betaines. No. 851,839. I. G. Farbenindustrie A.G.
Preparation of coagulated phosphates. No. 851,892. Kali-Chemie A.G.
Preparation of lead chromate and a mixture of lead chromate and sulfate. No. 851,729. The Priestman Collieries, Ltd.
Process for making paints, lacquers, varnishes, etc., non-inflammable. No. 851,742. J. H. C. Penners.
Preparation of green sulfur dyes. No. 851,754. I. G. Farbenindustrie A. G.
Humectant, detergent, dispersive and solvent agents. No. 50,171/693,815.* I. G. Farbenindustrie A.G.
Improvements in manufacture of compositions used in pyrotechnics. No. 50,158/820,713.* Ets. L. Ruggieri et M. Billant.
Catalytic treatment of hydrocarbons. No. 851,725. Standard Oil Development Co.
Improved soap. No. 851,812. G. Croulard.
Improved detergents. No. 851,813. Ets. L. Bobin (S.R.L.).
Production of hydrocarbon fractions rich in aromatics by extraction. No. 851,856. N. V. de Bataafsche Petroleum Mij.
Improvements in refining vegetable and animal oils. No. 851.883. Anderson, Clayton & Co.
Manufacture of thin sheets of rubber chlorhydrate. Nos. 851,770 and 851,771. Wingfoot Corp.

* Additions to patents previously granted. Second number is that of the original.

Foreign Chemical Patents

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Improvements in treatment of rubber. No. 851,775. Consolidated Rubber Manufacturers, Ltd.
Elimination of carbon dioxide contained in chlorine gas. No. 851,658. Potasse et Produits Chimiques (S.A.).
Manufacture of cold glue. No. 851,666. D. Audemard.
Catalytic hydrogenation process. No. 851,748. E. I. du Pont de Nemours & Co., Inc.
Preparation of emulsions. No. 851,777. Standard Oil Development Company.
Manufacture of condensation products. No. 851,810. Bayerische Stickstoff-Werke A.G.
Preparation of salt mixtures for the preservation of wood. No. 851,830. Allgemeine Holzimpragnierung G.m.b.H.
Process for preventing foam. No. 851,842. I. G. Farbenindustrie A.G.
Preparation of mixtures and moulding powders under pressure in organic condensation products containing sulfur. No. 851,869. Silesia Verein Chemischer Fabriken.
Preparation of water insoluble artificial resins. No. 851,905. I. G. Farbenindustrie A.G.
Manufacture of condensation products. No. 50,175/806,558.* Fahlberg-List-Akt. Ges. Chemische Fabriken.
Carbonizing or coking of fuel. No. 516,399. Didier-Werke A.G.
Flexible laminated material and method of manufacture. No. 516,248. Mallison & Sons, Ltd.
Production of flocculating gels. No. 516,294. Unifloc Reagents, Ltd.
Precipitation of zein. No. 516,294. Corn Products Refining Company.
Production of malt. No. 516,306. Boby, Ltd.
Manufacture of anti-serums. No. 516,315. Parke, Davis & Company.
Production of capillary-active substances. No. 516,188. Deutsche Hydrierwerke A.G.
Manufacture of alloys, particularly ferro-alloys or stainless or corrosion resistant steels. No. 516,319. Société d'Electrochimie, d'Electrometallurgie, et des Aciers Electriques d'Ugine.
Water-soluble composition for antiseptic, disinfectant, and deodorant purposes. No. 516,195. W. McClellan.
Manufacture of paper or paperboard. No. 516,322. Guard Bridge Paper Co., Ltd.
Catalytic preparation of liquid hydrocarbons by reduction of carbon monoxide. No. 516,329. A. M. G. M. Luyckx.
Formation of chromium containing layers on ferrous surfaces. No. 516,260. K. Daeves, G. Becker and F. Lindner.
Gas-mask filters and the like. No. 516,268. F. Voves, B. Fiedler and V. Eckhardt.
Manufacture and production of organic halogen-sulfonic acid chlorides. No. 516,214. I. G. Farbenindustrie A.G.
Manufacture and production of hydrocarbons from carbon monoxide and hydrogen. No. 516,403. I. G. Farbenindustrie A.G.
Manufacture of lubricants. No. 516,276. Union Oil Co. of California.

ENGLISH COMPLETE SPECIFICATIONS ACCEPTED. PUBLISHED JANUARY 17, 1940, AND SUBJECT TO OPPOSITION FOR TWO MONTHS FROM THAT DATE

Manufacture of colored plastic compositions and colored objects. No. 516,417. Cie. Nationale de Matieres Colorants et Manufactures de Produits Chimiques du Nord Reunis Ets. Kuhlmann.
Sensitized photographic emulsions. No. 516,468. Kodak, Ltd.
Extraction of cellulose from lignified fibrous materials. No. 516,515 W. T. Kerr.
Preparation of condensation product of lactic acid in crystalline form. No. 516,518. Professional Drug Products, Inc.
Heat treatment of aluminum base alloys. No. 516,423. E. H. Dix, Jr. and J. A. Nock, Jr.
Production of gaseous atmospheres for use in the heat treatment of metals. No. 516,566. Asiatic Petroleum Co., Ltd.
Manufacture of azo dyestuffs. No. 516,425. Society of Chemical Industry in Basle.
Method of and apparatus for pickling metals. No. 516,427. A. J. R Greer.
Manufacture of anti-knock motor fuel hydrocarbons. No. 516,521 Texaco Development Corporation.
Manufacture of compounds of the cyclopentanohydrophenanthrene series No. 516,443. Society of Chemical Industry in Basle.
Manufacture of carboxylic acids of the cyclopentanohydrophenanthrene series. No. 516,445. Society of Chemical Industry in Basle.
Production of coatings of highly polymerized artificial material on wires, threads, and the like. No. 516,447. Siemens-Schuckertwerke A.G.
Production and use of pro-oxidants. No. 516,476. Imperial Chemical Industries, Ltd.
Production of aliphatic acids or esters. No. 516,477. E. I. du Pont de Nemours & Co., Inc.
Manufacture of cyclopentanopolyhydrophenanthrene derivatives. No. 516,542. Society of Chemical Industry in Basle.
Manufacture of plaster board. No. 516,484. Imperial Chemical Industries, Ltd.
Production of gas suitable for the manufacture of alcohols. No. 516,546. F. L. Duffield.
Method and means for treating waste materials containing organic substances of animal or vegetable origin by mesophile or thermophile anaerobic conversion. No. 516,577. K. Peterson.
Manufacture of azo dyestuffs. No. 516,585. Society of Chemical Industry in Basle.
Manufacture of basic nitrogenous compounds. No. 516,586. E. I. du Pont de Nemours & Co., Inc.
Magnesium alloys. Nos. 516,454 and 516,464. G. von Giesche's Erben.
Production of fatty acid esters from starch factory by-products. No. 516,493. Corn Products Refining Company.
Starch products and method of making. No. 516,588. Conn Products Refg. Co.
Removal of magnesium from mechanical mixtures of metallic magnesium and beryllium. No. 516,589. I. G. Farbenindustrie A.G.
Continuous rectification of alcohol. No. 516,595. E. A. Barbet.
Treatment of raw cement materials. No. 516,601. F. L. Smidth & Co., Aktieselskab.
Separation of minerals from ores. No. 516,603. F. L. Smidth & Co., Aktieselskab.
Manufacture of artificial threads having fluctuations in count. No. 515,458. N. V. Onderzoekingsinstituut Research.
Manufacture of lacquered shaped articles. No. 516,607. I. G. Farbenindustrie A.G.
Method of diminishing the swelling capacity of cation-exchanging resins. No. 516,608. I. G. Farbenindustrie A.G.
Treatment of cation-exchange resins. No. 516,609. I. G. Farbenindustrie A.G.
Electrolytically refining copper and its alloys, and electrolytically treating metals plated therewith. No. 516,610. Siemens & Halske A.G.
Production of solutions of low substituted cellulose ethers. No. 516,634. E. I. du Pont de Nemours & Co., Inc.
Adsorption and purifying agent and means for producing same. No. 516,645. R. Adler.
Manufacture of nickel and cobalt salts. No. 516,657. Unifloc Reagents, Ltd.
Production of hydrocarbons. No. 516,555. A. J. V. Underwood.
Production of iso-butane from normal butane. No. 516,659. N. V. de Bataasfche Petroleum Mij.

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Aluminum base alloys. No. 516,766. British Aluminum Co., Ltd.
Treatment of sulfites. No. 516,767. Board of Trustees of University of Illinois.
Production of cellulose derivatives. No. 516,672. E. I. du Pont de Nemours & Co., Inc.
Acetylene generator. No. 516,681. I. G. Farbenindustrie A.G.
Desulfurizing iron or iron alloys. No. 516,684. Sachtleben A.G. fur Bergbau und Chemische Industrie.
Catalytic polymerization of acetylene. No. 516,688. E. I. du Pont de Nemours & Co., Inc.
Production of azo dyestuffs on the fibre, and compositions thereof. No. 516,690. Imperial Chemical Industries, Ltd.
Manufacture of cementitious products. No. 516,691. Lignocrete, Ltd.
Detergents and method of making. No. 516,735. Colgate-Palmolive-Peet Co.
Acetylation of artificial fibres. No. 516,698. Société des Usines Chimiques Rhône-Poulenc.
Flocculation of aqueous suspensions and sludges. No. 516,706. Unifloc Reagents, Ltd.
Manufacture of glyoxal. No. 516,740. I. G. Farbenindustrie A.G.
Filling and emptying storage containers for liquefied gases. No. 516,771. Ste. l'Air Liquide, S. A. pour l'Etude et l'Exploitation des Procedes G. Claude.
Manufacture of azo dyestuffs. No. 516,773. I. G. Farbenindustrie A.G.
Fused salt electrolysis cells. No. 516,775. E. I. du Pont de Nemours & Co, Inc.
Synthetic rubber-like materials. No. 516,776. Imperial Chemical Industries, Ltd.
Method of preparing alkylated hydrocarbons from normal paraffinic hydrocarbons. No. 516,780. Texaco Development Corporation.
Nail-varnish compositions. No. 516,788. E. I du Pont de Nemours & Co., Inc.
Application of coating compositions to base materials. No. 516,807. E. I. du Pont de Nemours & Co. Inc.
Coating compositions for producing dull or matte finish. No. 516,808. E. I. du Pont de Nemours & Co., Inc.
Method of producing alkyl compounds of lead. No. 516,874. Ethyl Gasoline Corporation.
Manufacture of methyl and ethyl lead compounds. No. 516,875. Ethyl Gasoline Corporation.
Stabilized soluble stannite depilatory. No. 516,812. W. B. Stoddard and J. Berlin.
Method of coloring glass fibres or other silicious fibres. No. 516,826. N. V. Mij. tot Beheer en Exploitatie van Octrooien.
Manufacture of alpha-substituted side chain ketones of the cyclopentanopolyhydrophenanthrene series. No. 516,828. Society of Chemical Industry in Basle.
Production of capillary-active substances. No. 516,879. Deutsch Hydrierwerke A.G.
Purification of silica sand and the like. No. 516,880. Rockware Glass Syndicate, Ltd.
Method and apparatus for refining or cleaning oils. No. 516,831. A. Schlegel.
Production of photographic multi-layer material. No. 516,883. B. Gaspar.
Manufacture of derivatives of the saturated and unsaturated cyclopentanopolyhydrophenanthrene series. No. 516,888. Society of Chemical Industry in Basle.
Purification of etched electrodes. No. 516,898. Siemens & Halske A.G.
Apparatus for stabilizing fermentable or alterable liquids. No. 516,833. C. A. Reymond and M. Reymond.
Sterol compounds and processes for manufacture. Nos. 516,845 and 516,846. Parke, Davis & Co.
Production of insoluble azo dyestuffs. No. 516,851. Ets. Kuhlmann.
Production of magnesium. No. 516,758. Dow Chemical Company.

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Improved process and product for sizing textiles. No. 850,925. F. De Selle and A. Paume.
Treatment of cloth to give it a pleasing appearance and a hand like wool. No. 850,932. E. Koechlin.
Preparation of nickel carbonyl. No. 851,076. I. G. Farbenindustrie A.G.
Improving the physical qualities of steel. No. 851,113. Dortmund Hoerder Hutten-Verein A.G.
Obtainment of glucinium compounds free from fluorine. Nos. 851,160 and 851,161. I. G. Farbenindustrie A.G.
Method of protecting steel or cast iron pipes against humidity, atmospheric influences, and stray currents. No. 851,046. Wspolnota Interesow Gorniczo-Hutniczych Spolka Akcyjna.
Hydration of olefines. No. 850,938. Les Usines de Melle.
Production of malonic acid derivatives. No. 850,996. I. G. Farbenindustrie A.G.
Preparation of pectine. No. 851,009. Sardik, Inc.
Preparation of neopregnane-3,20-diones, saturated or unsaturated, their derivatives or their homologues. No. 851,017. Société pour l'Industrie Chimique à Bale.
Preparation of olefine oxides. No. 851,077. I. G. Farbenindustrie A.G.
Diaryl compounds and process of preparation. No. 851,131. I. G. Farbenindustrie A.G.
Preparation of N-alkyl, N-cyclo-alkyl, N-aralkyl or N-aryl pyrrolidines. No. 851,178. I. G. Farbenindustrie A.G.
Collection of alcohol hydrocarbons. No. 851,182. Metallgesellschaft A.G.